AN HBJ PUBLICATION

December 1983/$2.00

WEEDS TREES & TURF

The Magazine of Landscape and Golf Course Management Since 1962

Guide to Tree and Shrub Fertilization

1983 Index to WTT Articles and Authors

Plants for Lakeside Landscapes

New Product Roundup

Oftanol®
insecticide

Dursban can make call-backs a thing of the past.

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3918

Circle No. 105 on Reader Inquiry Card

WT&T
DECEMBER 1983/VOLUME 22, NUMBER 12

Cover: Efficiency is the driving force behind new products for 1984. Shown are Ryan's Ride-Aire, Jacobsen's walk-behind rotary, Toro's Groundsmaster, and Mobay's Oftanol.

Certain trees do well by water, see page 22.

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Plants Adapted to Watersides Ease Care

Douglas Pullman of Dow Gardens evaluates plants for success along lakes, streams, and ponds. Why manage a plant which is not suited to waterside conditions when many plants are?

More maneuverable mowers, see page 25.

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New Product Roundup: Emphasis on Efficiency

If you still are using belly mowers on tractors, trim mowers to do medium-sized lawns, or small, slow aerifiers, your work is not as efficient as it can be. Manufacturers have given the professional landscape market a new look and have started making more efficient equipment for 1984.

Getting nutrients to tree roots, see page 32.

32
Fertilizer Guide: Part 3, Trees & Shrubs

In this third and final section, Davey Tree Expert Company's Funk and Rathjens outline the fertilizer needs of trees and shrubs and the practical methods to meet them. Determining fertilizer needs for an area rather than for each tree is helpful to commercial applicators.

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1983 Index of Articles and Authors

We want you to save your back issues and also save you the trouble of paging through them each time you are looking for a specific article or author. Each year we provide an index like this to make your research work easier. Make sure your library includes the December index of articles and authors.

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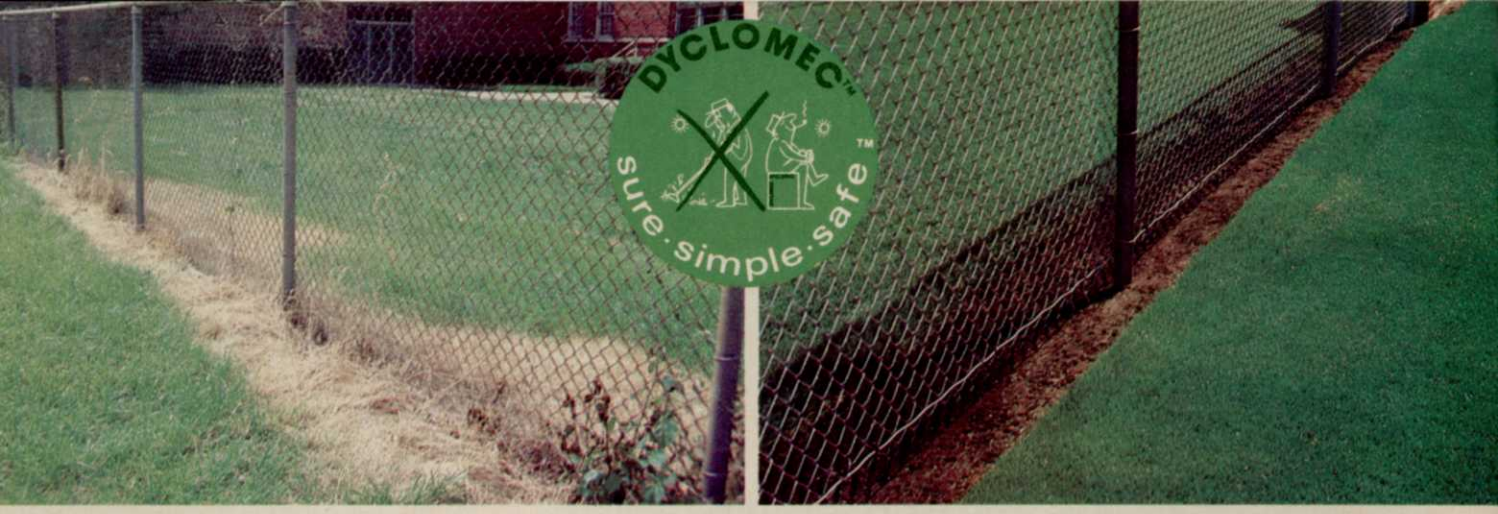


The grass along the fence in the photo at left was killed with a fast-acting systemic post-emergent herbicide. Obviously, no professional groundskeeper could abide this ugly mess, so the dead vegetation has to be removed with expensive hand labor. The systemic product is recommended for lawn renovation so, naturally, vegetation will grow back as new seeds germinate, resulting in an endless cycle of retreatment, ugly dead vegetation and more hand labor. Clean up a fence line with Dyclomec and vegetation will never again be a problem, because an annual pre-emergent application of Dyclomec will form a vapor barrier and keep the area absolutely clean.

Dyclomec turns Problem Areas into Beauty Spots

... and the vapor barrier eliminates repeated investment of hand labor to clean out dead vegetation.

Dyclomec is surely the most efficient herbicide that has ever been offered to professional landscapers. In fact, it is called the *landscaping herbicide*.

Now, at last, the groundskeeper can easily and economically achieve that manicured look, which consists of contrast. Of sharply defined areas where immaculate turf is contrasted with areas of beautiful, naked earth. Where ornamentals grow in an area of beds that are free of any distracting growth.

Until the advent of Dyclomec, such pristine landscaping could only be achieved with repeated investments of hand labor to clean out dead vegetation resulting from an endless cycle of regrowth and retreatment with a systemic herbicide.

But once an area has been cleaned up with Dyclomec, hand labor to remove dead vegetation will never again be necessary because an annual application of Dyclomec will keep the area absolutely clean. How is this possible?

On the page at the right are step-by-step illustrations of how Dyclomec works. Understanding its principle will help you discover the many labor-saving, money-saving ways it can help you in landscape maintenance.

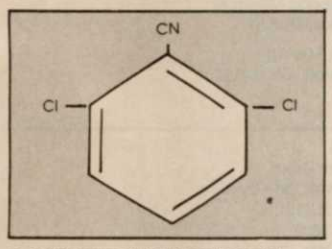
We urge you to read it carefully and call us toll free if you have any questions.

Dyclomec Applicator for Uniform Distribution

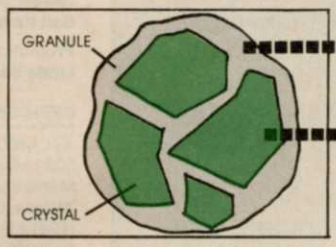
Because proper distribution of Dyclomec is important, this patented Acme Spred-Rite® G Spreader is the ideal tool. Granules are gravity-fed through deflector spikes that give a uniform pattern. Hold the head high for a wide swath; lower for a narrow swath; remove it for the finest line of control. Regulate flow with interchangeable orifice disks. Spreads any granular material. Lightweight. No moving parts.

Dyclomec with its pre-emergent and post-emergent action is ideal for vegetation control in mulch, or bark around roses and ornamentals, or in flagstone and gravel walkways. It works its way down to the ground and forms a vapor barrier which provides season-long weed control and maximum safety to desirable plants.

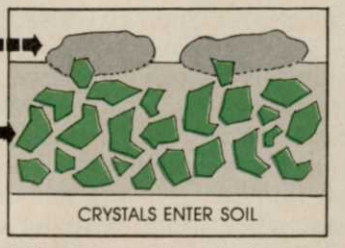
How Dyclomec controls weeds without harming ornamentals:



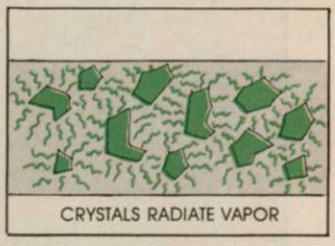
1. Dyclomec is a 2,6-dichlorobenzonitrile, commonly known as Dichlobenil. This unique herbicide goes directly to a vapor stage without going through a liquid stage. It is activated by temperature and soil moisture.



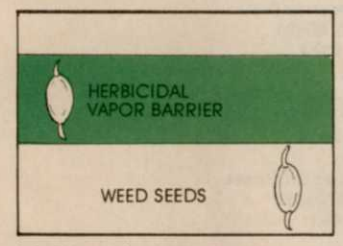
2. This remarkable herbicidal compound of razor-thin crystals is uniquely processed by PBI/Gordon to make a precise granule.



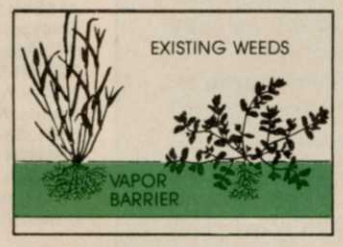
3. Granules are spread on soil surface. Moisture carries the Dyclomec crystals into the upper layer of soil. Because of adsorption by soil particles, lateral movement is minimal.



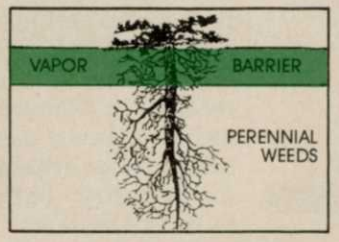
4. Temperature and soil moisture activate the Dyclomec crystals and they begin to radiate a herbicidal barrier. This continues for an entire growing season, and the spent crystals disappear, leaving no residue.



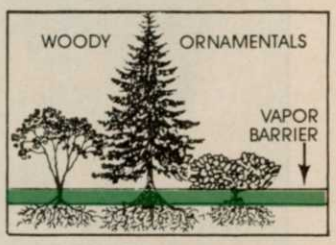
5. In this vapor barrier no plant cell division can occur. Seeds trying to germinate in the barrier will die. Sprouts below this zone will be killed as they try to penetrate the barrier.



6. Existing vegetation such as shallow-rooted grasses and annual weeds having root structures in this barrier will likewise be affected and die after two to three weeks.



7. Certain perennial weeds coming out of dormancy and attempting new growth within the Dyclomec barrier will run into the same dead end: they will be killed by the vapor.



8. Dyclomec, when used as directed, does not affect woody ornamentals, shrubs and trees that have deep roots extending well below the herbicidal vapor zone.

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Dyclomec 50-lb. bag not available in Washington, Oregon, Idaho; Neither size is available in California.

Call Gordon's Technical Service Department

If you have any questions about where and how to use Dyclomec, we invite you to call us. Our technical people have a combined experience of 95 years in working with the Dyclomec chemical.

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LANDSCAPING HERBICIDE

Circle No. 115 on Reader Inquiry Card

WTT OUTLOOK

By Bruce F. Shank, executive editor

Who'll be number two and three in the lawn care industry?

Bruce Shank

If Mark Parr is right, two more $100 million plus lawn care companies are going to pop up in the next few months or years.

Parr, a market analyst for Roulston Co., of Cleveland, says every established market has at least three major companies and the lawn care market lacks two. His job is to investigate companies in markets to determine their potential for investors. He has studied ChemLawn and the lawn care market for more than a year.

Few companies are close to ChemLawn's $150 million plus in lawn care services. Orkin, a division of Rollins, is in the big leagues if you combine pest control with lawn care. There are perhaps ten other companies doing between $10 and $30 million in lawn care on a regional basis; including Tru Green, Evergreen, Lawn Doctor, Davey and others.

Parr described how numbers two and three can be created. One way is large regionals combining under a holding company. They maintain their individual identity but gain the advantages of being larger. The buying power of large companies is beginning to entice manufacturers into selling direct, as they often do to the government.

Maureen Hrehocik

Another way is investor groups, foreign or domestic, buying out existing lawn care companies. Such groups are actively studying the industry. They have enough faith in the lawn care market to invest millions long term. Meanwhile, owners of lawn care companies established in the 60's and 70's may be interested in cashing in.

Finally, Parr thinks privately-held lawn care companies may decide to go public to generate cash for expansion or to increase the value of their stock. He says this option is often overlooked.

By this time next year there may be two or more lawn care companies in the $100 million bracket. **WTT**

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RANSOMES

BOB-CAT

The grass machine.

Circle No. 206 on Reader Inquiry Card

REGULATIONS

Pesticide fight approaches boiling point

After ten years of regulation under the Federal Insecticide Fungicide Rodenticide Act (FIFRA), pesticide manufacturers and users seem more involved in legal disputes than at any other time in the history of the Act.

Hearings on extension and amendment of FIFRA in Washington, D.C., new state laws on pesticide use, and a Supreme Court case to determine compensation to Monsanto for use of its glyphosate data by competitors all have associations preparing defenses.

Green Industry organizations are reacting quickly and professionally. You expect the National Agricultural Chemicals Association (NACA) to respond with "big guns", but today we are seeing very organized defenses being developed by the National Arborists Association (NAA) and the Professional Lawn Care Association of American (PLCAA) because they have combined their muscle in a group now known as the Pesticide Public Policy Foundation (PPPF). This new group has contracted a paid staff and applied to be incorporated as a non-profit foundation through a Washington, D.C. law firm. It has already received pledges of $50,000 and expects the 2,4-D Coalition to merge with it soon. NAA has asked members to donate .5 percent of their chemical sales to the group.

The American Association of Nurserymen keeps close watch on legislative activities, but is currently adjusting to the retirement of its lobbyist Leo Donahue. The Golf Course Superintendents Association of America is reviewing its involvement in governmental affairs under new Executive Director John Schilling.

During recent hearings by a House Subcommittee considering amendments to FIFRA, NAA Executive Vice President Robert Felix testified along with representatives of the National Wildlife Federation, the National Audubon Society,and NACA.

PPPF is establishing a group of listening posts to alert the organization of local or state legislation to defend the industry against anti-pesticide legislation, such as recently passed in Wauconda, IL.

The facts that EPA has a new administrator which environmental groups are lobbying hard, that FIFRA is up for extension, and that there is considerably more anti-pesticide legislation activity at the state and local level, all indicate an organized industry defense is needed more today than at any time since the law was passed.

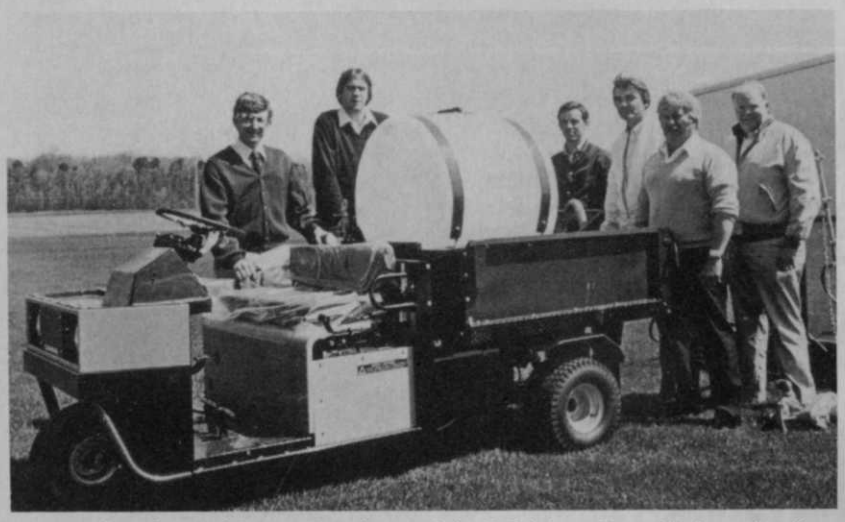
PGMS seeks full-time executive director

The Professional Grounds Management Society has begun a search for a full-time executive director, replacing its current part-time director.

Allan Shulder, grounds supervisor at the Greater Baltimore Medical Center for the past 18 years, has been the executive director of the 1,100-member organization on a part-time basis for the past six years.

The move to a full-time director was decided at a board meeting at the group's 71st annual conference in Cincinnati. Mort Rolsky, PGMS treasurer, told WEEDS TREES & TURF, "The board decided that in order to promote the organization properly, we needed someone who could devote time to it during the normal work day, when most (business) people are in and our members are out working."

Rolsky said qualifications for the new director will be in the public relations, marketing field, a recent college graduate or an assistant to a pr/marketing director. The search committee would like to be interviewing candidates by April.



Drs. Paul Rieke and Bruce Branham of the Michigan State University Crop and Soil Sciences Faculty and Michigan Turfgrass Foundation Board members Ed DeJong, John Read, Jerry Gill and Robert Hope inspect a portion of the turf care equipment recently presented to the foundation for use by MSU. The equipment is on loan to the university through a unique program sponsored by OMC-Lincoln, makers of Cushman and Ryan Turf care equipment, in cooperation with Spartan Distributors of Sparta, MI.

SEED UPDATE

Bentgrass harvest wrecked by rain

This summer it looked like the bentgrass seed harvest would survive the rain damage experienced with the fescue and ryegrass crops. The rain had stopped and it looked like the bentgrasses, the last seed crop to be harvested in summer, would escape damage in the fields.

But, the rain started falling again and Penncross and Penneagle crops are now reported to be only 30 percent of last year's crop. That means less seed and higher prices.

Tom Stanley of Turf-Seed Inc., of Hubbard, OR, said the bentgrass crop "was a disaster". Tee-2-Green Corp, also of Hubbard, represents growers of Penncross and Penneagle.

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Circle No. 117 on Reader Inquiry Card

GOLF UPDATE

Course remodeling trend growing

Remodeling seems to be the wave of the future for golf courses.

According to Ted Robinson, president of the American Society of Golf Course Architects, many courses built 25 or more years ago no longer challenge today's player, who has better equipment and can avoid the original hazards.

"Therefore," he says, "many courses are moving and adding traps, rebuilding their greens and enlarging tees. In many cases, they also are adding water hazards that serve as water retention ponds for the irrigation system."

Robinson said, however, that every remodeling project does not mean a complete construction project. Most courses retain a golf course architect to evaluate the playability of the layout and then submit a master plan that can be implemented over several years, depending, of course, on budget.

Design factors that many architects will review in the master plan are:

●Tees - Tees establish playability and are prime targets of improvement. They tend to be much larger and longer than in the past because of the beating they take from concentrated play. It is not uncommon for tees to cover 5,000 to 7,000 square feet in area on the modern course.

●Fairways - "Sparking up" a fairway can involve the reshaping of mounds, traps, lakes or ponds. Major gradework may be required to eliminate blind shots or to soften severe terrain.

●Traps - The trend has been toward milder convolutions of the edges of the traps and more gentle rise from the bottom of the trap to the top edge. Gentler contours make it easier to cut the edges with power mowers, reducing time and labor expenses.

●Ponds - Artificial ponds may be recommended. They enhance visual impact, offering a stimulating challenge if they are strategically placed and serve as a valuable water source. The excavated material can often be used to rebuild bunkers and mounds.

●Irrigation System - Good irrigation systems can't be overemphasized. The trend is toward completely automated systems. Installing an irrigation system is a relatively simple procedure. An 18-hole system can be installed in two to four months depending on the terrain and scope of the system, and is generally less disruptive than club members think. An automatic system can conserve water, reduce labor expense and allow watering during nighttime hours.

●Greens - The shape, size and protecting features of each green should be in direct relation to the approach shot. Although larger than those of earlier eras -- a good average size is 6,500 square feet - today's greens should offer variety. More and variable pin placements are possible with larger greens and alleviate problems caused by heavy play. Gentle undulations permit the use of machine mowers and reduce the risk of scalping. The green should be designed to drain in more than one direction. It is possible to enlarge a green and add traps without losing play, but the best way often is to reconstruct it entirely. It is less of a task to install additional drainage than is supposed. Critical areas can be retiled and backfilled and the sod replaced within one day.

NEWS *from page 8*

EQUIPMENT

Toro sues R&R in parts dispute

The Toro Company has filed a copyright infringement and unfair competition suit in U.S. District Court, Minneapolis, against R&R Product Co. of Tucson, AZ.

Toro alleges R&R, a replacement parts manufacturer, uses Toro's parts numbering system and copyrighted material from Toro's catalogs.

Vernon A. Johnson, vice president and general counsel for Toro, said, "The lawsuit was filed to provide our 55 domestic distributorships with a source of protection that by law is rightfully theirs."

PEOPLE

Alden Dow dies, landscape architect

Alden Dow, internationally recognized landscape architect and direct decendent of Herbert Dow, founder of Dow Chemical, died in September. Alden Dow had a great degree of influence on Dow Gardens in Midland, MI, and is known for his planning of Lake City, TX. He was a stockholder in Dow Chemical and sat on the board of the Dow Foundation, but was never employed by the company. Alden predicted a movement of people back to the urban centers of the country from the suburbs and believed in the use of native and exotic plant material. He was 79.

EQUIPMENT

New show planned for outdoor equipment

After spending years trying to get attention of dealers at the Hardware Show and other general shows, manufacturers of outdoor power equipment have developed their own show to be held July 23-25, 1984, in Louisville, KY.

A steering committee finalized plans during a meeting in September. Represented on the committee were Bolens, Briggs & Stratton, Brinley-Hardy, Bunton, Deere & Co., Dixon Industries, Gilson Brothers (Sensation), Homelite, Kohler, Lawn-Boy, MTD Products, The Toro Co., Simplicity, Wheel Horse, and others.

Although the show is really intended for equipment dealers, it's a good

continued on page 16

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2 new Series 10 tractors

2 new LCG tractors

5 new compact loaders

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Need more power? Check out two new Series 10 tractors –the 42 horsepower Ford 2910* and the 49 horsepower Ford 3910.* Each is ideal for big grounds maintenance jobs.

Or choose from two new Ford low center-of-gravity tractors, 42 and 62 horsepower,* specially designed for working on hilly and uneven terrain.

And for loader work in small spaces, Ford offers 5 new compact loaders, 18 to 62 horsepower.*† They've got the power, capacity and maneuverability to get work done fast!

Buy, rent or lease one of these new-generation Fords soon from your Ford Tractor dealer. He's listed in the Yellow Pages under "Contractors' Equipment and Supplies" and/or "Tractor Dealers."

** Manufacturer's estimated gross horsepower*
† Model CL-35 available late-1983

FORD TRACTORS

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There's a fine line between good turf and better turf.

It's the fine line of Turf Care™ products from SDS Biotech. These quality products give you first-rate weed and disease control with real economy all season long. Taken together, there's just no better way to get better turf.

Daconil 2787® fungicide. Unmatched spectrum of disease control. No other fungicide works as effectively on turf and a variety of ornamentals. Daconil 2787 provides unsurpassed control of 9 major turf diseases plus common diseases on 45 ornamentals. Daconil 2787 is also available in wettable powder.

Dacthal® W-75 herbicide. The leader is back on the market. It's the standard of excellence in turf preemergence weed control and it's readily available for the '84 season.

Whether it's crabgrass, spurge or 21 other annual grasses and broadleaf weeds in turf and ornamentals, nothing works better than Dacthal W-75.

Go with the best in 1984. Dacthal W-75.

Dacamine® 4D herbicide. Kills perennials better than ordinary 2,4-D. Dacamine 4D virtually eliminates the possibility of weed regrowth. It works particularly well on plantain and 70 other tough perennials.

Dacamine 4D also delivers broader spectrum weed kill than ordinary 2,4-D.

And since Dacamine 4D is non-volatile, it won't vaporize even in hot weather. So there's no risk of injury to nearby ornamentals from vapors.

2 Plus 2 (MCPP + 2,4-D Amine). Tough on weeds, easy on the pocketbook. Designed in a convenient package mix, 2 Plus 2 delivers economical control of pesky common broadleaf weeds such as clover and dandelion on turf and fairways.

For broad spectrum control that's tender on grass and non-harmful to tree roots, use 2 Plus 2.

Daconate® 6 and Bueno® 6 post-emergent herbicides. Proven performers. Especially effective on such tough weeds as nutsedge, chickweed, wood sorrel, crabgrass and many other grassy weeds.

Both products are ready-to-use liquids with built-in surfactants for uniform wetting (Bueno 6 is sold only in western states for use on turf).

Turf Care from SDS Biotech. Order now for better turf. Your hard work and expertise along with our fine line of Turf Care products are the perfect combination for healthier, more vigorous, more beautiful turf.

So see your SDS Biotech distributor and place your order today.

SDS Biotech

Agricultural Chemicals Business
SDS Biotech Corporation
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Always follow label directions carefully when using turf chemicals.

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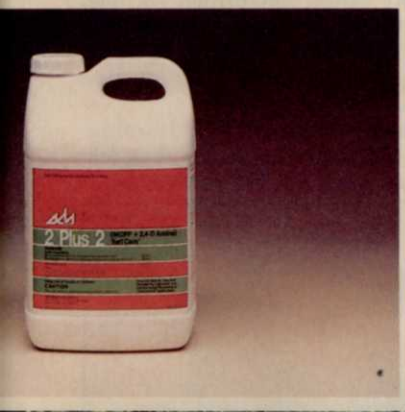

2 Plus 2

Dacamine
4D

Daconate 6

LANDSCAPE UPDATE

25 honored in PGMS awards

Winners in the 1983 Professional Grounds Management Society's Award contest were announced at the group's annual conference, this year in Cincinnati in October. They are:

●Category 1 - INDUSTRIAL OR OFFICE PARK IN-HOUSE: Grand award to Florida Gas Transmission, Winter Park, FL; Honor award to Allergan Pharmaceuticals, Irvine, CA. OUTSIDE CONTRACTOR: Grand Award to Martin Marietta Corp., Bethesda, MD, submitted by Chapel Valley Landscape Co., Woodbine, MD.; Honor to Bell Telephone Laboratories, Naperville, IL, submitted by Clarence Davids and Sons, Inc., Blue Island, IL.

●Category 2 - CONDOMINIUM, APARTMENT COMPLEX OR PLANNED COMMUNITY, IN-HOUSE: Grand Award to Alikar Garden Apartments, Colorado Springs, CO; Honor to Reston Homeowners Association, Reston, VA.
OUTSIDE CONTRACTOR: Grand Award to Mansion House Center, St. Louis, MO, submitted by Riverfront Landscape Maintenance Co., St. Louis, MO. Honor to Lake Meadow Association, Chicago, IL, submitted by Clarence Davids and Sons, Inc., Blue Island, IL; The Landing Homeowners Association, Portland, OR, submitted by Oregon Landscape Maintenance, Tigard, OR; Union Gap Village H.O.A., Clinton, NJ, submitted by Dubrow's Nurseries, Livingston, NJ.

●Category 3 - HOTEL MOTEL OR RESORT GROUNDS: Grand Award to The Cloister Hotel, Sea Island, GA, submitted by Sea Island Co., Sea Island, GA.

●Category 4 - GOLF COURSE: Grand Award to Ridgemoor Country Club, Chicago, IL; Honor to Bloomfield Hills Country Club, Bloomfield Hills, MI.

●Category 5 - CEMETERY OR MEMORIAL PARK: No winner.

●Category 6 - PARK AND RECREATION AREA: Grand Award to City of Newark, Newark, DE; Athletic Field: Grand Award to Meridian Junior College Baseball Complex, Meridian, MS.

●Category 7 - SCHOOL OR UNIVERSITY GROUNDS: Grand Award to Holy Cross College, Worcester, MA; Honor to San Jose State University, San Jose, CA and DePaul University, Chicago, IL, submitted by Clarence Davids and Sons, Inc., Blue Island, IL.

●Category 8 - GOVERNMENT BUILDING OR COMPLEX: Grand Award to Minnesota State Fair, St. Paul, MN; Honor to Carl S. English Jr. Gardens, Seattle, WA, submitted by U.S. Army Corps of Engineers, Seattle, WA.

●Category 9 - SHOPPING AREA: Grand Award to Downtown Tulsa Unlimited Pedestrian Mall, Tulsa, OK, submitted by Tierra Vista, Inc., Tulsa, OK; Honor to Puente Hills Mall, Industry, CA, submitted by Armstrong Garden Centers Inc., Monrovia, CA.

●Category 10 - HOSPITAL OR INSTITUTION: Grand Award to Friends Hospital, Philadelphia, PA; Honor to University of Massachusetts Medical Center, Worcester, MA.

●Category 11 - No winner.

●Category 12 - No winner.

NEWS *from page 12*

place for buyers to see the latest equipment lines before fall. Manufacturers will have the opportunity to give presentations about products and demonstrations. The show will be held on the site of the World's Fair, the Kentucky Fair & Exposition Center.

EQUIPMENT

Mott raises Berdych to distributor sales

Joseph Berdych, a 20-year veteran with Mott Corp., LaGrange, IL, has been named manager, distributor sales. He is the first person to serve as a liaison between Mott and its distributors.

Marketing Manager C.J. Horsley commented, "Joe probably knows more about Mott's products than anyone, and he knows ever Mott distributor personally."

Berdych sold his first Mott mower in 1957 while operating his own lawn mower business. He joined the company in 1963 as a territory manager.

SOD

Researcher receives $8,000 boost

The Sod Grower's Association of Mid-America has donated $8,000 to aid a University of Illinois turf pathologist conducting studies of various turf diseases.

Dr. Hank Wilkinson is conducting research on yellow ring disease,fusariam blight syndrome and other turfgrass diseases. This is Wilkinson's second award from the

continued on page 18

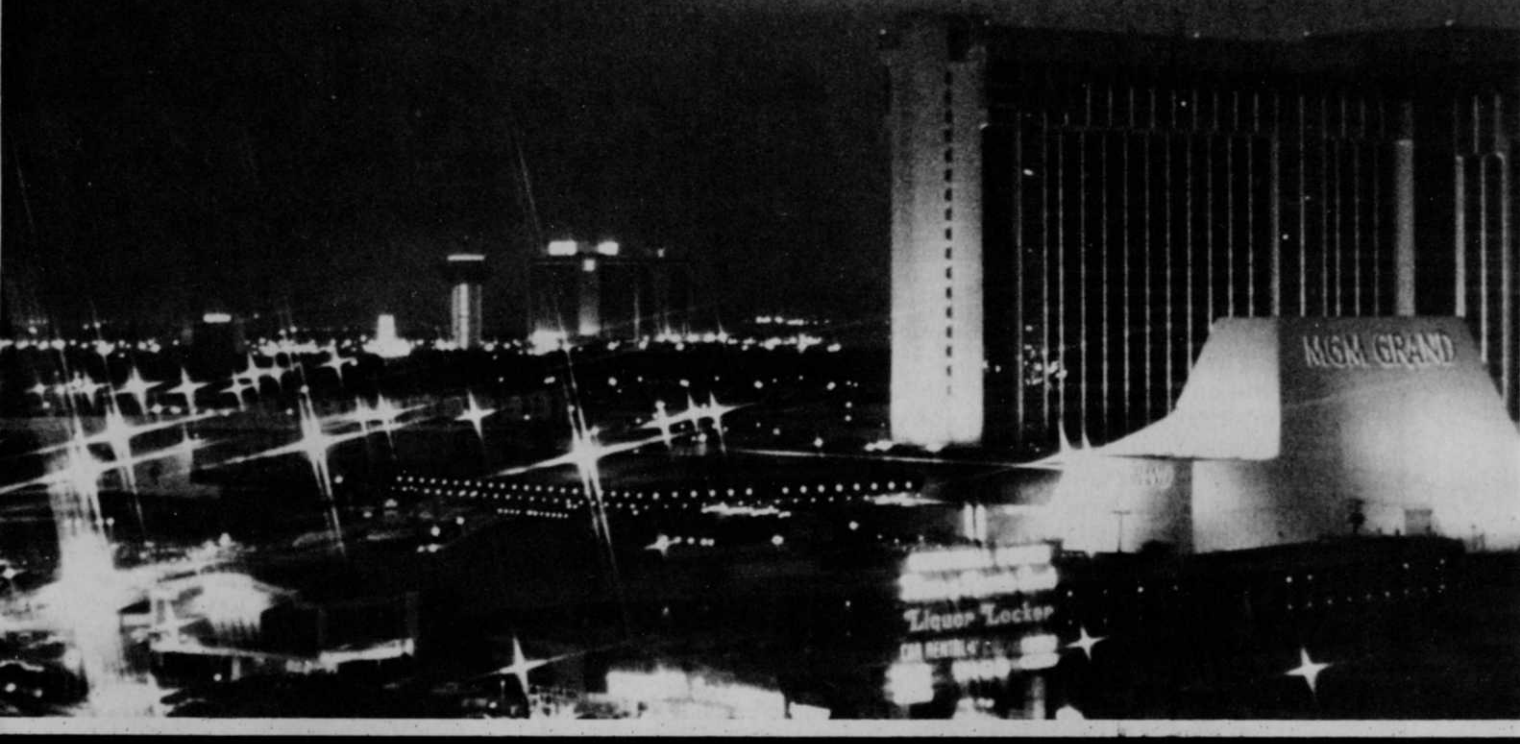
GOLF COURSE SUPERINTENDENTS ASSOCIATION OF AMERICA

LAS VEGAS

January 28th—February 3rd 1984

55TH INTERNATIONAL TURFGRASS CONFERENCE & SHOW

Education. Exhibits. Excitement.



An enriching experience for everyone in golf course management!

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Circle No. 108 on Reader Inquiry Card

GOVERNMENT UPDATE

Drift irks Long Island neighbor

The following article is reprinted with a different headline from Pest Control Progress, the newsletter of the International Pesticide Applicators Association. The first half is a letter to a newspaper in Long Island regarding tree spraying. It is followed by comments by Dennis Ryan, president of the New York Chapter of the International Society of Arboriculture and Director of Forestry and Horticulture for the City of New York Department of Parks and Recreation.

Recently, my neighbors had their trees sprayed against gypsy moths. Luckily, I was home at the time. I noticed quite a bit of spray was landing on my five-year-old son's toys and bikes.

When I went to the front of my house to close the windows, I was horrified to see insecticide cascading down on my car, baby carriage and stroller. Everything, including baby blankets, teethers, pacifiers and baby toys was drenched with spray. Only ten minutes before, my four-month-old baby had been asleep in the carriage. I was very upset. What if I hadn't been home or hadn't noticed the spraying and everything went unwashed?

The houses in my neighborhood are relatively close together and many trees are on property lines. Consequently, quite a few people are having parts of their property sprayed whether they want it or not.

Commercial sprayers should be required to inform all adjacent property owners of spraying before it is begun. They should also be required to contain the spray, as much as possible, to the property for which it is intended. I realize that it is impossible to contain the spray completely, but the spraying techniques I have seen can and should be improved.

The above letter was published in Newsday, a newspaper with circulation of more than 500,000 on Long Island. This letter and the feelings it conveys is not an isolated case.

Obviously, it becomes very difficult to defend the tree care industry against restrictive pesticide regulations when, seemingly, we are responsible, through our own negligence, for the fate which could befall us.

Can you answer yes to any of the following questions?:

- Do you send out crews that are inexperienced and lacking in proper pesticide application training?
- Do you allow your crews to continue spraying when the wind is blowing in order to get the job done?
- Have you sold a pesticide application when it was unnecessary?
- Do you have equipment on the road that is leaking or unclean?
- Are you still doing "broadcast" spraying and not target applications?

If we do not voluntarily clean up our act, some legislator will certainly try to do it for us. Don't wait until it's too late. As professionals we are responsible for our actions. It's up to each of you. Do your part!

NEWS *from page 16*

which has also given him a van to use for research activities.

During the past four years the association has also contributed $20,000 toward turfgrass disease research programs at Cornell University in New York.

EQUIPMENT

Wheel Horse sold to investor group

A group of investors led by the management of Wheel Horse Products, Inc., put together $13 million to buy the company from American Motors Corp. in late August. Wheel Horse's

Munn and Hawkins (l. to r.)

sales have been estimated at $50 million.

The City of South Bend, IN, helped finance the takeover to keep the company there, where it started in the late 40's. The company employs nearly 400.

John Munn will remain the president of Wheel Horse and Robert Hawkins will be vice chairman.

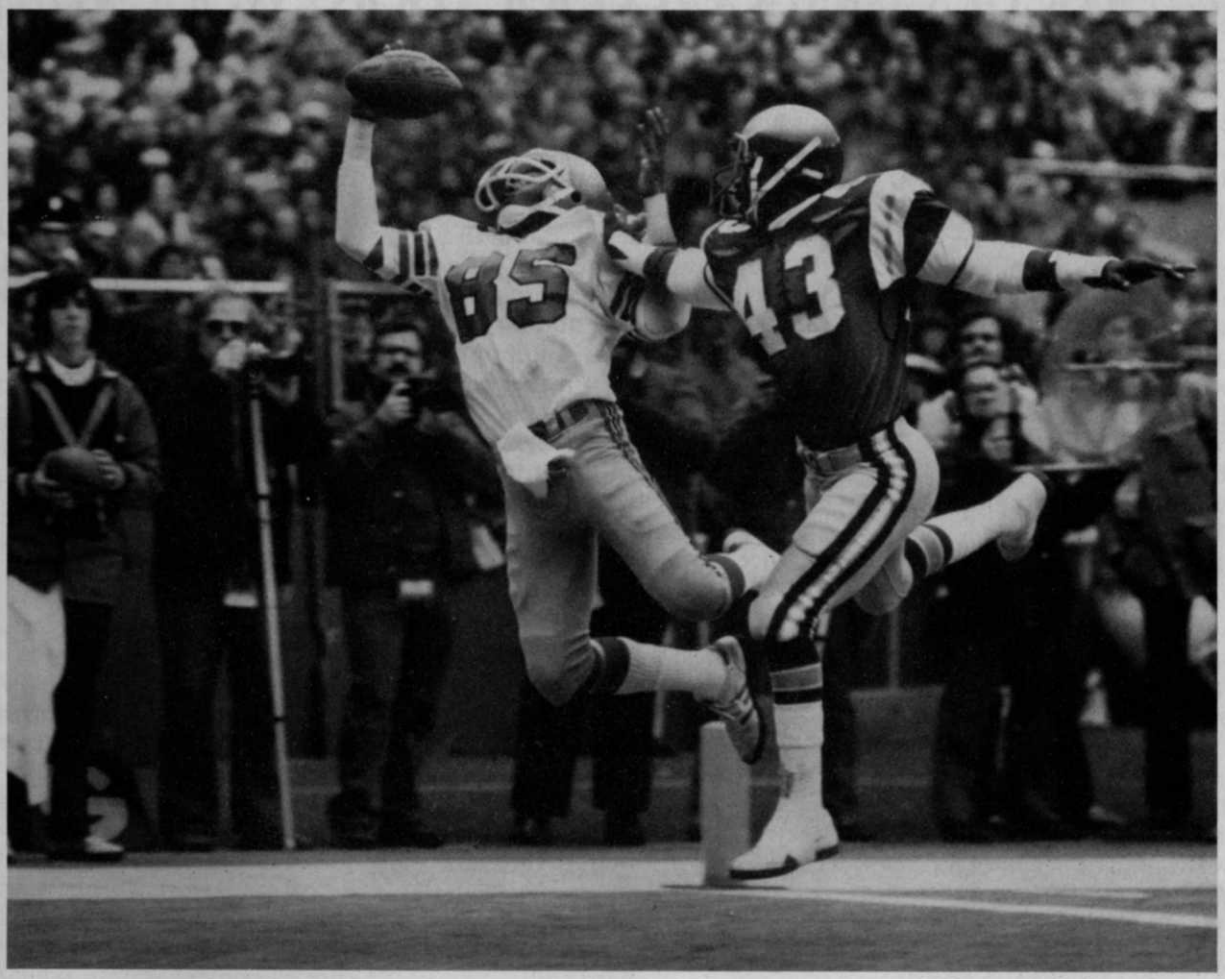
SEED

Robinson opens own research company

Mike Robinson, former vice-president of Pickseed West Inc., has opened his own Seed Research Inc. office to handle testing, development, production and marketing of turf and forage seeds. Regional seed companies will distribute the new firm's products. Robinson's ten years in the seed business includes trading, multiplication, production, varietal development and marketing. He is the current vice president of the Oregon Seed Trade Association.

The new offices are located at 29730 Harvest Drive, Albany OR 97321.

Does anyone's career depend as much on timing as a turf manager's does?



Possibly.

Pennfine Perennial Ryegrass covers more ground than any other turfgrass variety in the world. This message recognizes the people who made it happen.

For your free full-size (22" x 28") poster of this ad, send your name and address to:
Pennfine Poster #5, P.O. Box 923, Minneapolis, MN 55440. (Watch for the other five ads in this series.)

Circle No. 116 on Reader Inquiry Card

What makes Ryan turf-care equipment worth the investment:

Core cultivation, dethatching, sod cutting... equipment engineered for more work value.

Maintaining fine turf is part art. Part science. And a lot of hard work.

And because your turf aerification and cultivation equipment has to work so hard...for so long... and come back for more, we've designed a complete system of hard-working equipment that you can match to whatever your jobs demand.

With Ryan turf care equipment, your turf looks great. And your bottom line looks even better.

Here's why Ryan equipment is worth the investment:

A better way to aerate greens.

Nowhere is the quality of your turf so critical as on the greens. But considering the rough treatment they get from most aerators, you may be reluctant to aerate at all.

Not so with the Ryan Greensaire® II or Greensaire® 16—aerators so precise that even fresh holes won't affect the roll of a putt.

The Greensaire 16 gives you the same thorough aeration as the Greensaire II—but in a more economical size.

Unlike rolling aerators, the Greensaire tines don't tear into the turf. They penetrate it in a quick up-and-down motion, removing cores up to 3″ long.

Greensaire II (pictured at right) covers a 24″ swath; takes 36 cores from every square foot; and aerates up to 8,000 square feet per hour.

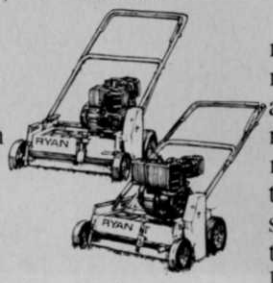
Add the optional Core Processor and you'll aerate, collect thatch, break up cores and top dress all in one operation.

The Greensaire 16 offers the same thorough aeration, but in a more economical size. You get a 16″ swath; 36 cores per square foot; and a speed of up to 4,000 square feet per hour. An optional windrow attachment makes clean-up simple.

Both units are available with revolutionary heat-treated tines that provide self sharpening action and less plugging-up.

Once you've seen either Greensaire at work, you'll never settle for an ordinary aerator again.

The toughest power rakes on turf.



The Ryan Ren-O-Thins. 7 or 5 HP

It's no easy matter for a machine to spin a blade 2700 revolutions-per-minute through thousands of square feet of thatch, roots and hard soil.

Hour after hour. Day after day. Year after year.

How long can a power rake take that kind of stress? You'll never know until you've owned a Ryan.

Take our big Mataway®, for instance. It's powered by a mighty 10-hp engine; built around a massive cast iron block; and features a 4-stroke cycle for extra torque and longer life.

If you don't need the muscle of a Mataway, you can still get Ryan ruggedness in the 7-hp Ren-O-Thin® IV or the 5-hp Ren-O-Thin® III.

Interchangeable blades for all 3 models let you adapt your Ryan power rake to a variety of different jobs—from cleaning up surface thatch to deep slicing the soil.

A sod cutter that earns its keep.

Ryan's Jr. Sod Cutter is an investment every golf course can afford.

The compact size of the Ryan Jr. Sod Cutter makes it the only one economical enough for your golf course to own.

Its performance makes it the only one worth owning.

The 7-hp engine lets one man cut up to 135 feet per minute, up to 2-1/2″ deep.

And whether you choose our 12″ or 18″ model, you'll be getting a professional, uniform cut with straight edges.

And The Ryan Family of turf-care equipment is only available from your Ryan dealer. He's in business for the long haul, with a proven record of service after the sale and a complete line of turf-care equipment to meet your needs.

A free demonstration.

Of course, the best way for you to learn about Ryan turf-care equipment is to see it in action.

Right on your own golf course.

To do that, contact your nearest Ryan dealer or call us toll-free at **1-800-228-4444.**

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Waterside Landscape

Selecting plants suited to the shores of ponds, lakes, and streams.

By G. Douglas Pullman, aquatic biologist, and Douglas Chapman, horticulturist, Dow Gardens, Midland, Michigan.

Ponds, lakes, and streams are often highly prized amendments to the landscape. A great deal of effort is commonly devoted to keep them weed free. The management technology is now available at a reasonable cost to satisfy the most discriminating pond, lake, or streamside property manager.

Unfortunately, water features are sometimes managed or landscaped to appear out of place or "unnatural." A backdrop of upland plant types, e.g. trees, shrubs, or herbaceous perennials, may appear attractive, but the riparian has failed to support the biological system by introducing plants not well-suited to the moist or saturated soils surrounding a typical water body.

A large number of very ornamental marsh/bog and water plants are commercially available that are well adapted to oxygen-poor, water-saturated soils or for cultivation in the water body itself. A pond or lakeside can be put into perspective by the careful selection of ornamental aquatic and marginal plants.

Site Selection

The best location for water plants is any part of the landscape that is continually flooded or soggy. A lake, pond, or streamside is ideal, but marshy, lowland areas shouldn't be overlooked. Usually, these sites will already contain some aquatic plants, such as cattails and prudent weeding may go a long way to establish an attractive waterscape.

Plant Selection

Choosing the right water plant for a particular location depends largely upon plant habit. Figure 1 is a classification of water plants that we use. It is a good idea to

NEVER introduce any of the so-called "oxygenating plants," i.e. submersed and free floating/suspended plants, to a pond, lake, or stream. Many of these plants can become severe management problems once established and should be reserved for aquariums and garden pools where escapement to natural water bodies can be strictly controlled.

Water Lilies

Without question, the royal family of the water plants is the water lily family. Hybridizers have developed plants bearing flowers of nearly every hue imaginable. There are hardy and tropical day blooming varieties as well as exotic night blooming tropicals. The hardy hybrid water lilies at the Dow Gardens bloomed from late May through October, 1982, a display rivaled by few other plants. Select only the hybrid varieties as some of our native varieties, such as the White Water Lily or Cow Lilies, tend to be more aggressive and could potentially become a management problem. We generally recommend the following hardy water lilies to beginning water gardeners:

'*Chromatella*'-A very hardy variety with brown spotted leaves and bright yellow flowers
'*Marliac Rose*'-Rich green leaves, rose-colored flowers with yellow stamens, very floriferous
'*Rose Arey*'-Pure pink flowers
'*Attraction*'-Vigorous, red flowers.

The lotuses are very striking but may be too aggressive in natural lakes and ponds; therefore, their use should probably be avoided.

Water Interface Plants

The continually moist or flooded soils at the water's edge are the locations for marginal and emersed

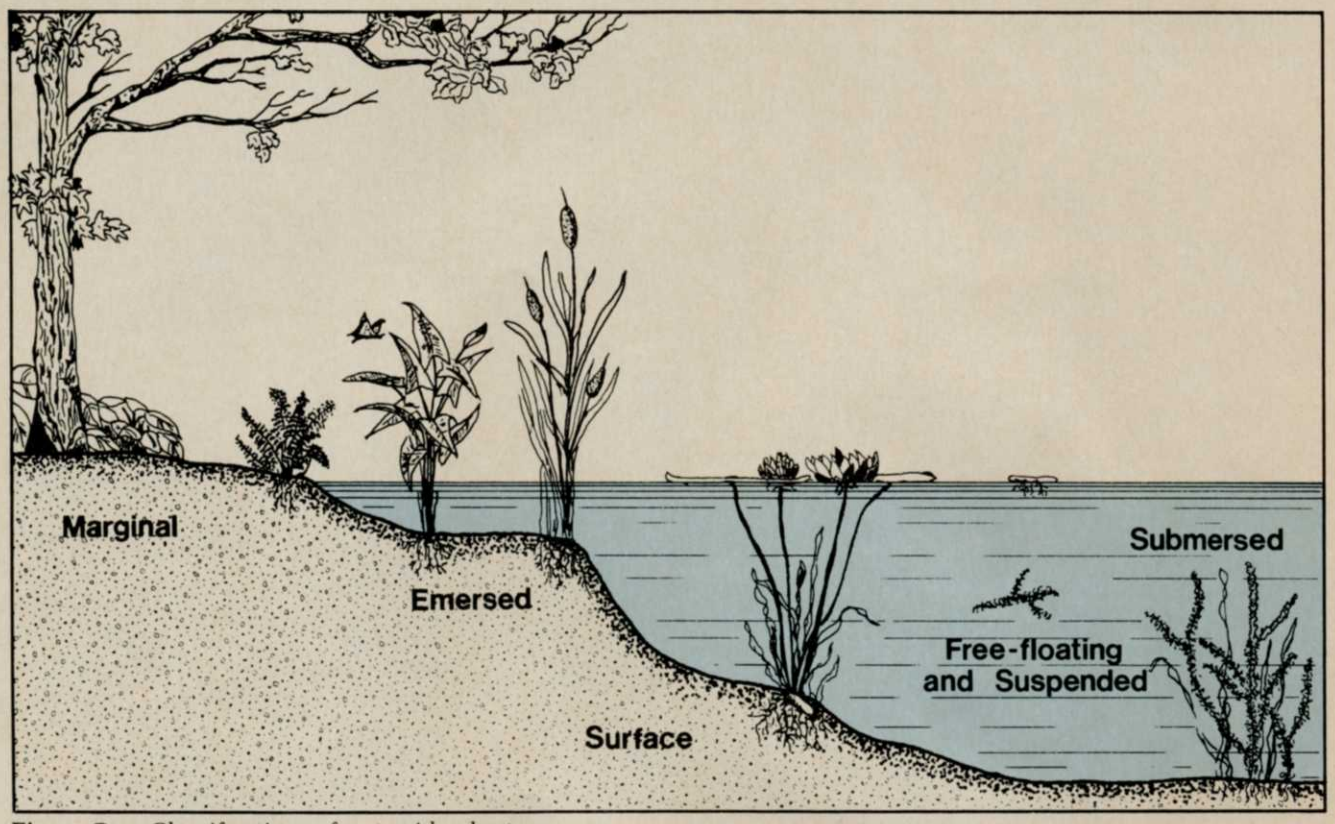

Figure One. *Classifications of waterside plants.*

plants respectively. Consider the Blueflag Iris for emersed planting and Louisiana Iris and Siberian Iris for marginal planting. Yellowflag is an exotic and can be difficult to control; therefore, it is not recommended.

Variegated Sweet Flag is a beautiful foliage plant with green and white striped "iris-like" leaves. Arrow Arum is the finest of the arrowhead group with its compact habit and striking veination. Both the Arrow Arum and Sweet Flag are good for either emersed or marginal culture.

Cardinal Flower is known for vibrant red flowers and is a good marginal plant. Bog Bean has attractive white fringed flowers and will thrive in the water and on wet mud, making it a good ground cover. Also consider Bunchberry as a marginal ground cover. Pickerel Wood is valued for its foliage and blue flower spikes in the emersed zone. A favorite, because of its early yellow flowers, is Marsh Marigold and a double-flowered variety is now commonly available.

Other common plants that thrive in moist soils include *Hosta*, *Astilbe*, selected *Mimulus*, primroses, and impatiens. Avoid Modern's Pink and Flowering Rush as both are exotic and have a potential to become serious pests.

Many ferns will also complement the riparian landscape. Cinnamon Fern and Royal Fern are two good choices.

It is always a good idea to consider the impact of deciduous leaf fall in water systems. Therefore, place deciduous shrubs and trees sparingly on the water's edge or, even better, at a "safe" distance from the shore (consider, also, wind direction).

A number of shrubs will thrive in saturated soils, such as Redosier Dogwood, Hibiscus or Swamp Mallow, Sweet Pepperbush, and pussy willows. Other worthy shrubs are in the genus *Spiraea*.

The weeping willow is generally considered the classic tree in the riparian landscape. It does require some maintenance because it drops a great deal of debris on the landscape and water. There is quite a variety of trees worthy of riparian consideration. Tree selections fall into three groups, according to the ability of the tree to withstand varying periods of root crown inundation or low soil oxygen.

Swamp Species

Outstanding "swamp trees," or those typically growing in standing water for most of the year, are Dawn Redwood, Bald Cypress, the larches, Eastern Redcedar, and European Alder.

Flood Plain Species

Flood plain trees are those found in flood plain areas, being able to withstand periods of root crown inundation, lasting several weeks during the growing season. Representative flood plain species are the Red Maple, Silver Maple, White Ash, and Eastern Redbud.

High Water Table Species

The final tree group is comprised of those species that thrive in well-drained soils yet require a high water table. Consider River Birch, Paper Birch, Hemlock, and European Beech for such sites.

Appropriate plant selection for pond, lake, and streamside areas will not only assure greater plant vigor but will also make a water feature an even more exciting and natural part of the landscape. **WTT**

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New Product Roundup

2

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If you are still using tractor belly mowers, trim mowers for medium-sized lawns, or slow corers, you're not as efficient as you can be

By Bruce F. Shank
executive editor

Landscape managers can reap the benefits of an unusual number of product developments in the coming year. Unlike some industries, where product changes are a new paint job or body style, the changes in the professional landscape management market can be linked directly to increased efficiency and better performance.

Much of the change resulted from increased manufacturer interest in the landscape management market as agriculture, consumer lawn and garden, and construction markets became less reliable.

The continued strength of the golf market and the growing importance of the lawn care market represent a good hedge against fluctuating markets for manufacturers. They can count on steady product sales, despite a lower overall sales volume. As one John Deere dealer from Mississippi said, "We have to sell 20 professional mowers to make the same profit as one combine, but we haven't sold many combines the past two years."

The chemical market has expanded bullishly into specialties, which include professional turf and tree products. This represents a new commitment by national chemical companies to low volume products.

At the same time, regional reformulators are playing a greater role in marketing products for national chemical manufacturers. Custom blending of fertilizers and herbicides for specific regions is growing. If this trend continues, national manufacturers may sell much of their product to regional reformulators as components rather than final product.

Registration of new chemicals at the Environmental Protection Agency has slowed once again as new Adminstrator William Ruckelshaus reviews the state of his agency, environmental groups make trouble on a local level, and the courts settle a number of crit-

1. Jacobsen Walk-Behind Rotaries, circle 200.
2. John Deere Walk-Behind Rotary, circle 201.
3. Toro Groundsmaster, circle 202.
4. Ransomes Riding Out-Front Rotary, circle 203.

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Lebanon — we're working from the ground up to bring you better turf. Let Lebanon work with *you*.

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5. Excel 261 with Collection System, circle 204.

6. Cushman Frontline with Collection System, circle 205.

7. Jacobsen HF-5 with Baskets, circle 206.

8. Toro Reelmasters with 5, 7, and 11 blades, circle 207.

9. Bunton Motorized Spreader, circle 208.

7

ical cases. National manufacturers relying on state local needs labels the past few years to speed introduction of new pesticides or expanded uses of existing products, have been followed by environmentalists. A great part of the defense of pesticides is now at the state and local level.

Nevertheless, significant new products successfully reached the market in 1983 which give landscape managers a new dimension to chemical programs. The secondary benefits of chemicals have also been realized more in 1983 than previous years. For example, Embark (a growth regulator) from 3M and Rubigan (a turf fungicide) from Elanco have provided help in the control of Poa annua on golf course fairways.

We have grouped the following new products by their benefits to the industry. You will see that the Green Industry was making progress while other industries were standing still. You can take advantage of this progress in the coming year.

Mowers Cut Job Time

Without a doubt, the mower market underwent the most change in 1983. Responding to concern by maintenance contractors over labor costs, mower manufacturers introduced highly maneuverable walk-behind and riding out-front rotary mowers. The 21-inch trim mower and the tractor belly mower have nearly been relegated to the consumer market as a result.

The out-front walk-behind rotary from 36- to 60-inches wide was not a new concept. Until 1983, many considered them ugly ducklings of little consequence. Then, a few experimenting contractors found they could virtually replace trim mowers and cut job time in half. The word got to manufacturers and they responded quickly with improved versions. This past August, the number of out-front walk-behind rotary mower manufacturers doubled.

The riding out-front rotary with sulky has matured into a full-scale, highly maneuverable

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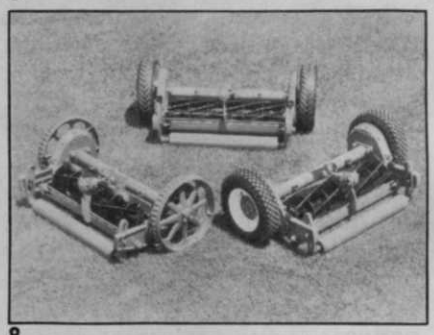

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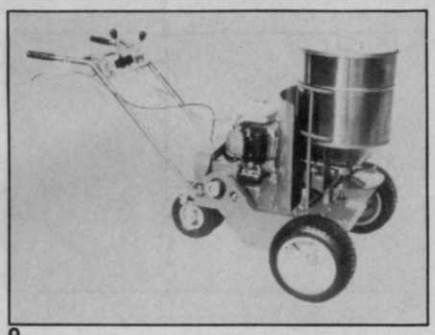

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mower that can whirl around trees or glide along fence rows and flower beds in minutes instead of hours. Although the riders do not match the walk-behinds in maneuverability or low price, they are a great improvement over previous large rotary or reel mowers.

Both the walk-behind and the riding out-front rotaries can be credited with upgrading the image of the mowing contractor. They have replaced equipment which appears no better to the customer than what he has in his own garage. The professional appearance of the new technology, as simple as it may seem, goes a long way toward improving the reputation of the mowing maintenance company to its customers. Not only do the new mowers reduce labor costs, they improve the image of the industry.

Another rejuvenated, surprisingly successful type of mowing equipment has been the reel gang. Hydraulics and an eleven-blade reel option are bringing new life to reel gangs for large turf areas. Reel gangs have been able to provide a wider cutting swath than rotaries and are less likely to scalp. They are inexpensive compared to some of the recently introduced reel mowers costing more than $35,000. Sharpening has been a stumbling block for mowing contractors.

Clipping removal is gaining acceptance in both golf and lawn care sectors. Lawn care companies see clipping removal as a partial solution to thatch. Golf course superintendents are experimenting with clipping collecton to remove Poa annua seedheads. Both seem to accept the extra trouble of handling clippings and replacing nutrients removed with the clippings.

Equipment companies have responded by developing collection systems which dump quickly and easily, such as Cushman's Front Line mower, Excel's collection system, and John Deere's entries into professional mowing maintenance this year. Jacobsen recently introduced baskets for its HF-5 light-weight fairway reel mower.

Spreaders and Sprayers

Lawn care has caused considerable attention to application of both wet and dry products on turf. Making one or both methods meet the speed and accuracy requirements of commercial lawn care has been the job of resourceful lawn care businessmen and manufacturers.

The effort to improve the flexibility and efficiency of liquid systems has centered around injecting insecticides, extra herbicides, extra nutrients, and fungicides into the flow from the main tank on the truck. This enables the operator to make needed adjustments on site by controls either on the truck or on the spray gun instead of making a second application.

Low volume systems are also being tried. By using higher concentrations of chemicals in less water, the lawn care company can use smaller, more fuel-efficient tank trucks.

Dyes to show spray pattern are being introduced for golf courses and possibly lawn care. These help prevent missed areas or over-application.

Dry technology has also advanced. Standard centrifugal spreaders provide varying application rates depending on the walking speed of the applicator. Lakeshore and Bunton have introduced motorized centrifugal spreaders so application speed is the same regardless of the applicator. This allows precise application of dry chemicals where control of rate is critical.

Speeding Up Coring

The importance of coring or aerification of turf to solve compaction, drainage and thatch problems has been known and used for golf courses, but the technology has been too slow and impractical for lawn care.

Drum aerifiers pulled by tractors or turf trucksters are an option used by golf course superintendents for fairways. Still, some superintendents use the

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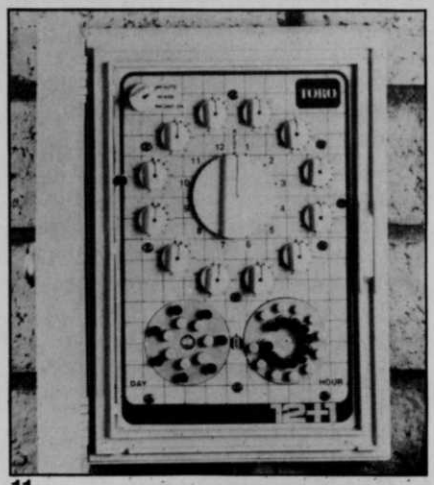

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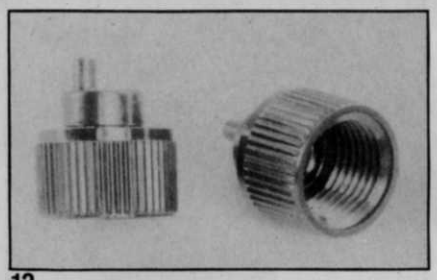

12

10. Ryan Ride-Aire, circle 209.

11. Toro 12+1 Controller for Drip and Normal Irrigation, circle 210.

12. Rain Bird Shrub Bug Compensating Emitters, circle 211.

slower, greens aerifiers for fairways. Small, walk-behind aerifiers, as made by Dedoes, Ryan and Turfco, have had some impact on lawn care.

Ryan just introduced a faster, riding aerifier called the Ride-Aire. The trailerable unit can core more than 12,000 square feet per hour and fits through standard fence gates. There should be increasing interest by manufacturers in lawn care type aerifiers in 1984.

More Versatile Vehicles

There is new respect for the turf vehicle market by manufacturers of golf car and industrial vehicles. As a result, the Green Industry will have more models to choose from in 1984.

Part of this movement will be the attachments available for turf vehicles as hydraulics are designed into them. Jacobsen engineers are working hard to design reliable multi-use hydraulic systems for its turf vehicles. Mower manufacturers are preparing to defend their turf against the golf car manufacturers who have entered the heavy-duty turf vehicle market. Cushman/Ryan may have set an example by getting out of the golf car business in favor of the turf vehicle and attachment market. Its introduction of the Front Line mower last year would support this idea.

A relatively simple addition of a Vicon spreader to a turf vehicle received considerable attention at turf shows this past year. There is more to come.

Irrigation Changes Due

Turf irrigation manufacturers were relatively quiet in 1983 with most product introductions in the area of controllers. The consolidation of Buckner with Royal Coach, a nearing cut-off for use of Colorado River water in the Los Angeles area, and drought in many parts of the country may have held the market back this year.

Meanwhile, smaller companies have been making steady advances in drip irrigation. As water restrictions are put in force, drip may be the most sensible irrigation for trees and shrubs.

Large irrigation companies are now paying more attention to drip irrigation.

Still, the bigger market is turf. When the decision is made to invest in turf, irrigation becomes almost a necessity. As water gets more expensive and less available, older inefficient systems will have to be improved.

The controls are no longer the limiting factor in irrigation. Now, the primary limitations are the pipe, valves, and heads. Emphasis will have to switch to these components. Look for water-saving concepts in these areas in the near future.

Chemical Tools Increase

Considerable progress has been made across the board with chemicals, especially with insecticides and fungicides. The emphasis has been on efficacy and residual period in both cases.

Although there is still no such product as a single, total spectrum fungicide, advances have been made with dollar spot, Fusarium, brown patch, and Pythium. Residual period has been stretched from 10 days to nearly six weeks for some fungicides. New names in fungicides are Bayleton from Mobay, Rubigan from Elanco, Subdue from Ciba Geigy, and Vorlan from Mallinckrodt. Rhone Poulenc has restored the Chipco name for its 26019. Older fungicides are being mixed with newer ones to improve control. TUCO Upjohn's Acti-Dione can now be mixed with Bayleton 25SP or Daconil 2787 from SDS Biotech. Much of the skill in using

continued on page 30

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ROUNDUP *from page 28*

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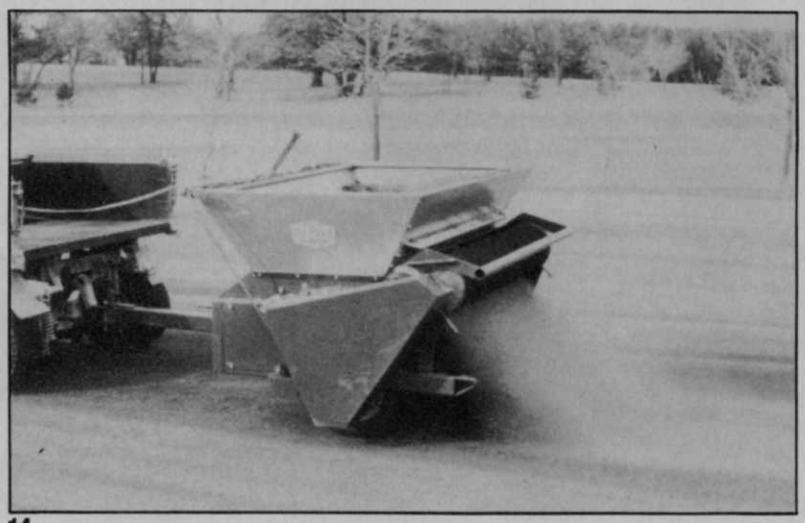

14

13. Mobay's Oftanol Insecticide, circle 212.

14. Turfco Mete-R-matic II Topdresser, circle 213.

fungicides is knowing how to mix them safely to get the best overall control of diseases. Look for a new fungicide from Ciba-Geigy next year called Banner.

Oftanol was the big name in insecticides this year. Mobay has instituted a major program to sell Oftanol to both national and regional reformulators in the coming year. Oftanol's success is linked to both high degree of control and nearly season-long residual. Ciba-Geigy is very close to registration with Triumph, another highly effective, long-lasting insecticide. Ortho/Chevron is waiting to hear from EPA on a turf label for Orthene. Dymet from Mallinckrodt is already on the market. Dursban from Dow has an expanded label and new formulations pending.

Zoecon Corp. introduced a new insecticide for ornamentals this year called Mavrik Aquaflow. The insecticide is labelled for use outdoors and indoors on non-food plants. It has low phytotoxicity and is effective against mites and other major pests.

The major thrust of herbicide changes this year was to improve control of specific problem weeds such as crabgrass, goosegrass, annual bluegrass, and nutsedge. Stauffer is very close to label approval for Devrinol which has shown good, long preemergence control of crabgrass and goosegrass and some control of Poa annua. BFC, now a subsidiary of Schering AG, has developed Prograss for Poa annua control. Elanco has discovered its fungicide Rubigan has a secondary benefit of Poa annua control as has 3M with Embark. Ciba-Geigy now has a new label for Princep for annual bluegrass control in warm-season turf.

BASF Wyandotte has expanded the Basagran label for nutsedge control in warm-season turfgrasses. Rhone Poulenc has received a new label for its Buctril for broadleaf weed control in turf. Union Carbide recently introduced Weedone DPC for broadleaf weed control in turf.

There were two developments in industrial, total kill herbicides this year. American Cyanamid introduced Arsenal which lasts several months in the soil to control weeds that germinate after application. PBI/Gordon assumed the marketing of dichlobenil this year giving it the new name Dyclomec.

Elanco's Treflan label has been expanded for premergence grass and weed control around ornamentals. Poast is a new postemergence herbicide from BASF Wyandotte for grassy weeds around ornamentals.

Growth regulators are still in the future of turf. 3M is giving many seminars nationally for its Embark. Elanco should hear from EPA soon on its Cutless growth regulator. Ciba-Geigy and Monsanto are also working on growth regulators at this time.

Turf Varieties Grow

Fine-leaf tall fescues are the news in the turf seed business. The number of varieties keeps growing and includes Falcon, Jaguar, Rebel, Clemfine, Houndog, Apache, Brookston, Mustang, and Olympic. Seed production of these new varieties was hurt by weather this year but there are limited quantities if you speak up early. These grasses exhibit good drought tolerance and meet the needs of many lawns in the transition zone.

Next to the tall fescues, the action is in perennial ryegrasses. These grasses have made strides in winter hardiness and mowability. They are fast germinating and extremely useful for all types of overseeding. We are now seeing the results of second and third generation research with perennial ryegrasses, such as Manhattan II and Citation II. So, improved perennial ryegrasses keep getting improved.

Penneagle is now a partner to Penncross for bentgrass greens. Many golf courses are renovating after the Toronto bent disaster two years ago at the Western Open in Chicago.

Kentucky bluegrasses are still coming despite an oversupply threatening to make prices fall. The results of the first National Kentucky Bluegrass trials have given some interesting results comparing old and new Kentucky bluegrasses. Unfortunately, these results are not for publication. You may ask you seed supplier for the results of the trials conducted in your area. **WTT**

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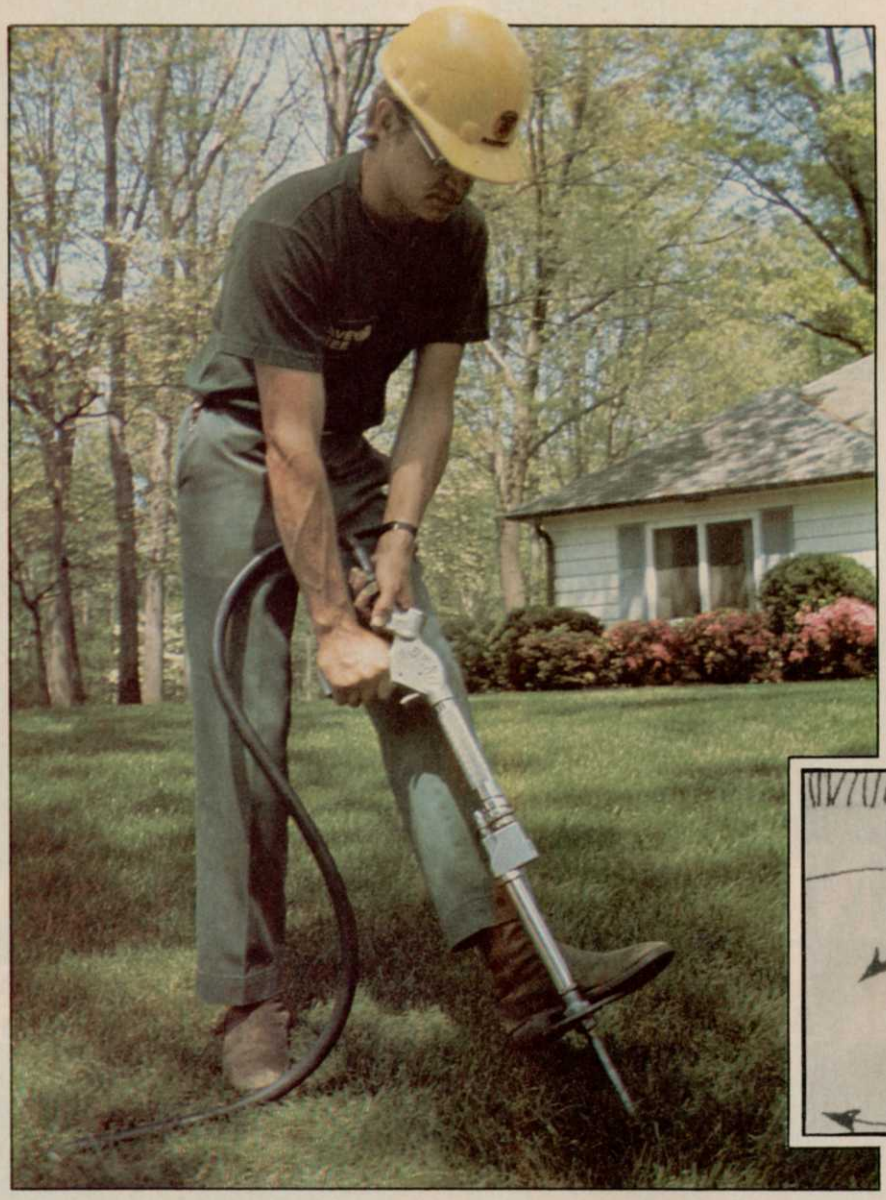
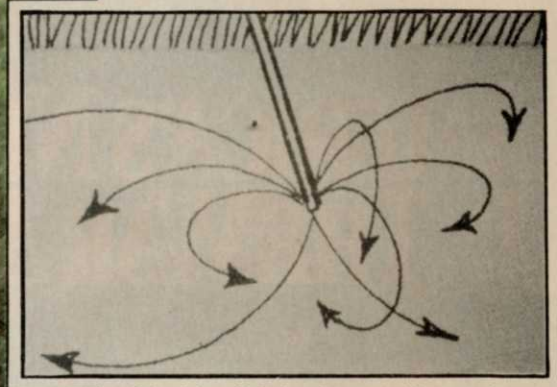
Fertilizer Guide



Part 3:

Trees Deserve At Least the Same Care as Turf

By Roger Funk, Vice President, Research and Development, and Richard Rathjens, Agronomist, Davey Tree Expert Co., Kent, Ohio



Liquid soil injection *provides good distribution of nutrients in the soil.*

Fertilization of landscape trees and shrubs is important because they are often grown out of their native habitat and are subject to adverse soil and environmental conditions.

Compacted soils, poor drainage, restricted root areas, highway salts, air pollutants and competition from turfgrass contribute to plant stress and increase the importance of regular fertilization to maintain healthy growth. Vigorous, well-maintained trees are more resistant to many insect and disease pests, are more attractive, and a greater asset to properties.

Trees absorb and utilize at least 13 elements from the soil. Of these, only nitrogen, phosphorus and potassium are normally considered when fertilizing. Supplemental nutrients, such as iron and manganese, may be necessary for certain species growing in alkaline soils.

Nitrogen is required in greater amounts than the other nutrient elements and is more often deficient in soils. Plants generally respond to applications of nitrogen, often with dramatic improvements in shoot growth and leaf color. Heavy applications of nitrogen alone may stimulate shoot growth more than root growth, disturbing the natural root-shoot ratio. Soil analysis for nitrogen is not particularly useful due to its transitory nature in soils and the large amount extracted by plants.

The need for supplemental phosphorus and potassium is difficult to determine since they normally do not produce a visible response except on young or newly transplanted trees and shrubs. Field study results have been inconsistent due to differences in soil, tree age and loca-

for trees

tion, and fertilization timing and methods.

Arborists fertilize trees and shrubs with a complete fertilizer where reliable soil tests are not available for phosphorus and potassium. The most practical approach is often to determine what elements are deficient in a market area and to base the fertilizer formulation on a market basis rather than case by case.

Plants in alkaline soils are more likely to need additional micronutrients.

Specific soil/plant deficiencies can be addressed, if necessary, on an individual basis. In most cases, a 3:1:1 or similar ratio is satisfactory for landscape plants. Additional potassium and micronutrients may be advisable in sandy soils.

Plants in alkaline soils, particularly ericaceous or "acid-loving" plants, may need additional micronutrients. Iron deficiency chlorosis is common on oak, rhododendron and pine grown in alkaline soils and has been reported on sweet gum, ginko and birch, as well as other woody ornamentals. Manganese deficiency chlorosis, common with maples, is also induced by alkaline soils.

Application rates

Most fertilizer recommendations are based on the number of square feet in the growing area for shrub beds or the branch spread of individual trees and shrubs. Fertilizer recommendations based on trunk diameter can result in overfertilization and damage to plants if the root system is restricted by paved areas, foundation walls, or other obstructions in the soil.

Three pounds of actual nitrogen per 1,000 square feet per year or six pounds every other year is satisfactory to maintain the health and vigor of deciduous trees and shrubs. If leaf color, annual growth, or general vigor is unacceptable, six pounds of nitrogen per 1,000 square feet may be applied annually.

Broadleaf evergreens, small shrubs, flowering trees and recently transplanted or declining trees are more sensitive to fertilizer salts and should receive only about one-half the recommended rate, particularly when quick-release fertilizers are applied. The risk of injury to sensitive plants may be reduced by splitting the recommended amounts into two or more applications.

The amount of fertilizer to be applied per 1,000 square feet of root area can be calculated by dividing the percent nitrogen on the fertilizer bag into the desired nitrogen per 1,000 square feet. For example, to determine the amount of 30-10-10 fertilizer required to apply six pounds of nitrogen per 1,000 square feet, divide 6 by .30 (30 percent). The result is 20 pounds per 1,000 square feet.

Application timing

Fertilization is most effective when supplemental nutrients are available during periods of optimum root growth. Although the roots of woody plants may elongate throughout the growing season, active root growth most often occurs in early spring and late fall when soil temperatures are relatively cool and there is little competition from leaves for water and nutrients.

Soluble nitrogen fertilizers, because of their short residual in soils, should be applied between October and December or between February and April. Controlled-release nitrogen ensures availability in the root zone for a relatively long period and application timing may not be a major concern.

Application techniques

Supplemental nutrients can be supplied to landscape plants through foliar sprays, trunk injections, or applications on or beneath the soil surface. Though each method has advantages in specific situations, woody plants are well-equipped to absorb nutrients through the root system and in most cases respond best to soil applications.

Surface applications

Nitrogen fertilizers can be applied to the soil surface since nitrates are highly mobile in soil solution and will move downward into the root zone. Surface applications for woody plants in sodded areas should not exceed one pound of soluble nitrogen per 1,000 square feet per application, or three pounds per 1,000 per application of controlled-release nitrogen.

Since turfgrasses within the application area may be injured or respond with undesirable succulent growth, trees and shrubs in quality lawns can be fertilized with subsurface applications, either placed in vertical holes or injected below the soil surface.

Fertilizer containing phosphorus should not be applied to the soil surface. Phosphorus is bound tightly to soil particles and does not move downward to the roots. Surface applications of phosphorus may also stimulate annual bluegrass in home lawns.

Fertilization is most effective when nutrients are available during optimum root growth, October to December and February to April.

Drill hole technique

Fertilizer can be placed in the root zone by drilling holes in the ground and dividing the recommended amount of fertilizer equally among the holes. For trees, the holes should be drilled 12 to 18 inches deep and 18 to 24

inches apart, beginning two to three feet from the trunk and extending two to three feet beyond the drip line of the tree or shrub.

To prevent turfgrass injury, the fertilizer level should be at least four inches below the soil surface. Calcined clay, Perlite, or other soil amendment can be used to fill the top of the hole. In quality lawns, a plug of grass can be removed before drilling and replaced after the fertilizer is added.

Soil injection

Liquid soil injection is an alternative to the drill hole technique. It provides more thorough nutrient distribution in the root zone and can be done in about one-fourth the time. But, you have to be careful since soluble fertilizers have relatively high burn potentials and may be rapidly leached from the root zone.

The injection equipment consists of a hydraulic sprayer operated at 150-200 psi and an injector probe that inserts about 12 inches into the soil. The injections are normally in a grid pattern about three feet apart in the same area as the drill hole technique.

Soluble nitrogen will stay in the soil for as little as six weeks.

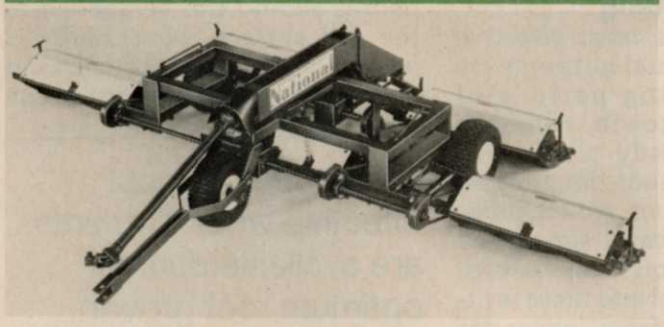
The actual amount of soluble fertilizer applied is often less than one pound nitrogen per 1,000 square feet. The rate is moderate because of factors such as drought and decline which increase the sensitivity of plants to fertilizer salts. After application, soluble nitrogen may remain in the root zone for as little as six weeks, further reducing the amount of nitrogen available for absorption.

Suspension fertilizers are rapidly gaining acceptance for soil injection because of the limitations of soluble fertilizers.

Ureaformaldehyde is particularly effective as a controlled-release nitrogen source in spraying systems since the release rate is not greatly affected by particle size. Suspended in water, powdered UF can be injected into the soil and dispersed laterally by hydraulic pressure.

At least 60 percent of the total nitrogen in UF is water insoluble and becomes available over a one- to two-year period. UF has a significantly lower burn potential than soluble nitrogen sources.

Power Quint II



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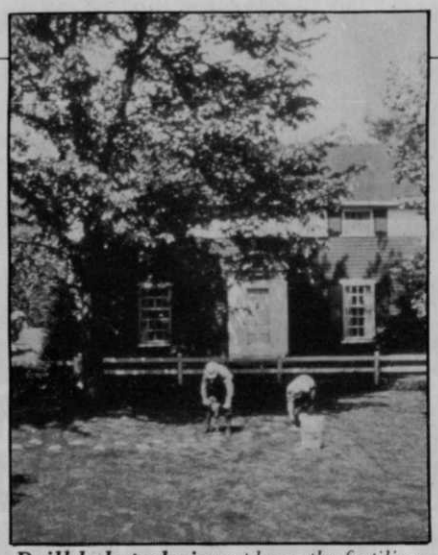
The nitrogen salts are released gradually as the compounds degrade, safely supplying the recommended annual rate of three to six pounds of nitrogen per 1,000 square feet in a single application.

Soluble methylol and methylene ureas—reaction products of urea and formaldehyde—have recently been introduced in the lawn care industry. These compounds have a lower burn potential than urea or other soluble nitrogen sources but their release characteristics and usefulness in tree care have not yet been determined.



Drill hole technique *places the fertilizer under the soil surface avoiding lush growth of turf on the surface.*

Other methods

The aero-fertil technique injects dry fertilizer by blasts of air into holes which have been previously drilled in the soil. This method is similar to drill-hole application and provides additional aeration by fracturing heavy or compacted soils.

Fertilizer stakes or spikes are solid formulations of fertilizer driven into the ground at intervals beneath the drip line of trees and shrubs. Although they contain satisfactory fertilizer materials, one or two spikes per inch of trunk diameter provide only a small amount of fertilizer. Limited lateral distribution of the fertilizer within the root zone of most soils permits only a small amount of fertilizer to reach the root system.

Foliage sprays, trunk injections, and trunk implants supply a limited amount of nutrients to woody plants. They are recommended for micronutrients where availability is reduced by alkaline soil conditions. They are most effective when a single micronutrient is deficient.

Micronutrient deficiencies

Micronutrients are more likely to be chemically unavailable to roots than low in the amount present in the soil. Sandy soils are the exception to this.

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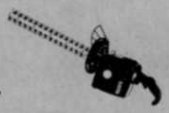

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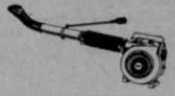

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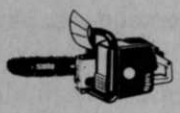

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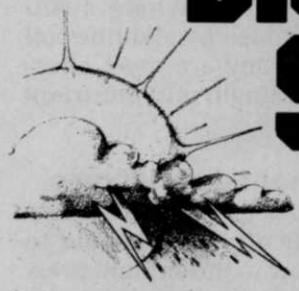

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MEDALIST TURF PRODUCTS

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Fertilizer

Soil applications to prevent or correct micronutrient deficiencies include nitrate or sulfate salts, chelates, and sulfur. Results have not always been satisfactory due, in part, to insufficient applications of the amending agent, severity of the deficiency, and soil problems such as excess alkalinity and poor drainage.

Foliar treatments, implants, and injections are discouraged for plants suffering from moisture stress.

Micronutrients in the form of nitrate and sulfate salts are often included in fertilizer formulations, but not in sufficient amounts to correct a deficiency. In addition, micronutrient salts may quickly become insoluble in alkaline soils and unavailable for absorption by plants.

Recommended rates for landscape plants vary depending upon the micronutrient source, the soil pH and texture, and whether or not the plants are growing in a lawn. Inorganic salts of micronutrients may injure turfgrasses at the rate recommended for woody plants and should be applied during the dormant period, preferably by subsurface application.

Chelates remain more soluble in alkaline soils than inorganic salts and can be applied to the soil surface or injected into the soil. Chelates also are less likely to cause injury to plants than inorganic salts and last longer in the soil. However, the cost of chelated micronutrients is considerably higher than for inorganic sources.

Chelates are marketed under various trade names with formulations for different conditions and purposes. Recommended rates usually vary from two pounds to six pounds per 1,000 square feet. Select the proper product for a particular situation and follow directions on the label.

Acidifying agents, such as sulfur and sulfuric acid, are normally injected into the soil or placed in vertical holes. Depending upon soil texture and pH, large amounts of sulfur may be required over a number of years to correct the pH of calcareous soils. To minimize the potential for injury to woody plants, 20 pounds per 1,000 square feet should be the maximum amount of sulfur applied at one time. Turfgrass injury has been reported at rates above five pounds per 1,000 square feet. Attempts to acidify large areas of soil with existing landscape plants have generally not been successful.

Foliar sprays are especially effective on ericaceous plants, such as rhododendrons, to correct iron deficiencies. Not all plant species, however, respond to foliar-applied micronutrients. Applications are recommended just prior to or during active shoot growth in the spring. Applications later in the season may also be effective.

Response to foliar treatments will vary depending upon the species, age and condition of the plant, time of year, micronutrient applied, and severity of the deficiency. For best results, the plant should not be suffering from moisture stress, the leaf surfaces should be thoroughly covered and the humidity should be high enough to allow the spray to remain on the leaf in soluble form long enough to be absorbed. Both chelated and inorganic micronutrients are recommended.

Trunk injections and implants are recommended to correct micronutrient deficiencies in trees over four inches in diameter which do not respond satisfactorily to soil treatments.

For trees which have begun to decline, the best results are usually obtained from trunk treatments in conjunction with soil applications of fertilizer. Once the deficiency has been corrected, attempts should be made to maintain adequate micronutrient levels in the soil to avoid repeated wounding of the trunk.

***Iron chlorosis** is evident on a maple.*

Injections or implants should be spaced four to five inches apart and as low as possible on the trunk. Since the outermost xylem (wood) rings are actively transporting water and dissolved minerals, capsules should be placed or injections made in this area. Capsules or materials which seal the injection hole should be inserted just below the bark tissue to facilitate proper wound closure. The best and most rapid callusing occur when treatments are made before growth starts in the spring.

In addition to commercially available injection and implant products, micronutrients can be injected with the same equipment recommended for Dutch Elm Disease, which is inexpensive and simple to use.

For iron-deficient pin oaks, dissolve 1.5 to 2 grams of ferric ammonium citrate in one to two cups of water for each injection.

Trees under moisture stress should not be treated with trunk injections or implants. **WTT**

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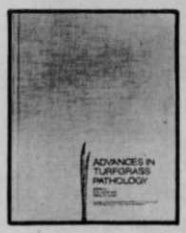

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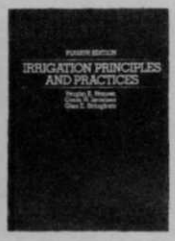

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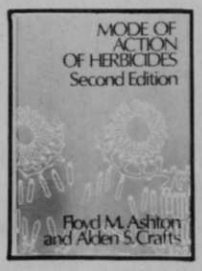

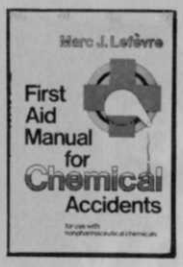

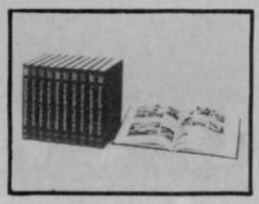

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PROBLEM SOLVERS

By Balakrishna Rao, Ph.D., and Thomas P. Mog, Ph.D.

Pros and cons of clippings

Problem: *Grass clipping pickup and disposal presents a problem to most of us. I would appreciate your comments on leaving clippings in the lawns.(Texas)*
Solution: Reports suggest that return of clippings over an extended period of time tends to reduce the turfgrass quality under conditions of intensive turfgrass culture. Clippings should be removed when the blades are too long or they have a high potential for the development and spreading of diseases. Under intensive turfgrass culture, if the plant is growing rapidly, the clippings should be removed.

Turf grown under a low-intensity fertilizer program can benefit by returning the clippings. These clippings release nitrogen to the soil which in turn can be utilized by the turfgrass plant. This would reduce the total amount of nitrogen required by the plant.

If possible, try to use a mower that would shred or mulch the clippings to aid in decomposition.

Fall webworm fights off controls

Problem: *There is an awful lot of fall webworm in our part of the state this year. Will it kill the trees? (Indiana)*
Solution: Webworm has been building up in Ohio, too, over the past several years. To my knowledge, tree mortality has not been attributed to the feeding activities of this insect *(Hyphantria cunea)*. By the time the webworms and their webs are really noticeable, the leaves have produced the bulk of the food the tree needs for next year's growth. For this reason late season defoliators are thought to be less injurious to the tree than pests which feed on the new foliage in spring or early summer. For the tree, this is especially fortunate because the fall webworm feeds inside of the tough, silken webs it builds. Once a web of any size has been constructed it is difficult to get insecticides through the webbing and to the feeding caterpillars.

Most people feel that the large webs detract from the ornamental value or beauty of their trees. To these people management of this pest is justified. Just remember that if insecticides are used, they are best applied as soon as the problem is detected.

A cultural control for fall webworm is to prune out the nests and destroy the caterpillars inside when both webs and worms are small.

Pesticide inventory important

Problem: *While making an inventory, we found many different kinds of unused pesticides in our storage area. Is there some way we can determine whether they are still good to use or if they have broken down? We would appreciate your comments in this regard. (Michigan)*
Solution: It is good that you are making an inventory and are concerned about the unused pesticides. Pesticide breakdown depends on the type of pesticide, its age (shelf life), and the storage condition. The following signs of pesticide breakdown should be checked:

1. Caking of wettable powders or dusts.
2. Deposits in the bottom of containers of emulsions or any separation or different colored layers of the liquid formulations. Cold weather may cause some liquid formulations to crystalize or precipitate out. Warming and agitation often correct this problem.
3. Rust spots on containers indicate humidity in the storage area or some chemical reaction of the pesticide with the container.

If you see any of these unusual signs, you should not use those pesticides. Discard the pesticide following the safe disposal guidelines. Be careful while handling pesticides which have broken down as they may be more toxic. Inventory control, that is purchasing only pesticides which are intended for annual use and using the older pesticides first, will minimize the potential for waste.

Turf establishment after Roundup

Problem: *How long does it take for turfgrass to establish that has been seeded into old sod sprayed with Roundup? We sprayed the lawn, waited seven days and seeded. Over a month has passed, and although the lawn turned brown, no new grass is showing yet. (Indiana)*
Solution: Establishment time will depend on time of year, available moisture, turfgrass species seeded, rate at which seed is applied, and technique of application. Under ideal conditions, the lawn will begin to "green up" in about two weeks after seeding.

Balakrishna Rao is plant pathologist and Thomas Mog is pest management specialist for Davey Tree Expert Co., Kent, OH.
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By Thomas W. Fermanian

Simple steps curb winter turf damage

Winter damage is seldom caused only by exposure of the turf to low temperatures.

Commonly, the turf is weakened by one or more external events which lowers the tolerance of the grass to low temperature. With this lowered tolerance, injury can result from relatively short exposures to freezing temperatures.

An explanation of these "external events" is necessary, therefore, to totally understand winter damage. The most common problem is the desiccation of plant tissue. When dry winds remove moisture from leaves and stems, minor damage occurs and recovery in spring is rapid. If the meristematic tissue of the crowns is dehydrated, the damage is much greater and a serious loss of turf results.

Methods of Water Loss

The mechanisms of water loss are the same in both cases. Simple transpiration is one method of loss. Transpiration only occurs when free water is available in the soil for uptake by the roots. When the moisture level in the turf tissue is low and the roots cannot absorb water from the soil, a more serious mechanism of water loss occurs. As the air temperature drops, ice crystals begin to form in the intercellular spaces but not within the living cells. This causes water to move from within cells across to the cell membrane to the intercellular spaces. A water deficit can result within the cell. Hardened cool-season turfgrass can tolerate this phenomenon well. Damage occurs, however, during early spring when the hardening process reverses. The turf can no longer tolerate sharp drops in temperature and damage results. Insulation from an extreme temperature drop, therefore is most critical in late winter. Snow is good insulating material which does not require removal in the spring. Snow fences can be erected in the fall to help the accumulation of snow on crucial areas (perennial ryegrass turf, tall fescue turf, open areas, etc.) When expected snowfall is minimal, other materials, (leaves, straw bark chips, etc.) can be used to provide insulation. Follow recommended procedures to prevent snow mold when using any cover material.

Excessive Water a Villain

Excessive water is another leading cause of winter damage to turf. In areas of poor drainage or where underlying soil is frozen, water can accumulate during thawing periods. Thawing can occur in some locations under intense sunlight while air temperatures remain below freezing. If these areas remain under water for an extended amount of time, the grass crown tissue takes up water. Grass tissue in this hydrated state is more sensitive to low temperature.

A sudden drop in temperature below 20 degrees Farenheit can cause serious losses. Compacted areas (green fringes, tees, etc.) are quite prone to this type of damage.

What can be done to prevent these catastrophies? First, don't panic. Many damaged areas will recover slowly if managed properly. Find the extent of the damaged area, or better yet, determine first if there is any winter damage. If you have had damage in an area before or if you suspect a likelihood of trouble, remove several plugs of turf as soon as the soil allows. Place the plugs in a greenhouse or in your shop, allowing them to warm up slowly and watch for new growth.

After several weeks, you will know if there is anything to worry about, you missed the damaged areas, or you can begin to plan for renovation. Despite the results, it is nice to know before the growing season.

It is not too late to prevent some potential winter damage. Remember, most damage occurs during late winter or early spring during periods of thawing weather. Don't try to save everything; concentrate your efforts on the critical areas where you suspect problems. Where standing water is a problem, try to remove it slowly.

Snow and ice preventing natural runoff should be removed or grooved to release the water. One alternative to physical methods is to apply a coating of dark material (activated charcoal, Milorganite) to the ice or snow and let the sun do the rest.

Ice Cover Problems

Ice cover over bentgrass or Kentucky bluegrass is generally not a serious problem. Other cool season turfs, especially perennial ryegrass can be seriously damaged by an ice cover of moderate duration. Large continuous sheets of ice over perennial ryegrass turf should be removed mechanically or as previously outlined.

If too little water is the problem, be cautious in applying more. Where snow cover is lacking, straw, leaves, or other mulching materials can be used to buffer the turf from a sudden drop in temperature and minimize further water loss. Use only mulching materials that are weed seed free. Weeds will tend to be a problem in damaged areas, therefore, Tupersan should be used in conjunction with seeding Kentucky bluegrass. Bromoxynil can be used to control immature broadleaf weeds after germination.

Plan ahead for next winter. Correct drainage problems this season for areas receiving winter damage. Be certain the soil moisture levels are adequate next fall before draining the irrigation system. Don't aerify critical areas late in the year and consider using a mulch where snow cover is minimal. Mulches also promote early green-up in spring.

Utilizing these few procedures, winter damage to turf should be a problem of the past. **WTT**

Thomas W. Fermanian is Extension Turfgrass Specialist at the University of Illinois, Urbana.

Bill Schader
Ranch Manager
AmFac Garden Cal-Turf; Camarillo, CA

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Kentucky Bluegrasses (1 = best)	Rutgers University 23 entries seeded—1976 data—1977-79 (3 yr. average)	Ohio State University 40 entries seeded—1978 data—1980	University of Illinois 20 entries seeded—1978 data—1980	Kansas State University 45 entries seeded—1979 data—1980	Camarillo California 25 entries seeded—1977 data—1978	University of Idaho 62 entries seeded—1979 data—1980
Columbia	2	3	1	13	2	6
Midnight	*	1	3	13	*	1
Baron	14	39	12	23	13	27
Adelphi	1	36	2	16	4	4
Victa	20	38	*	15	*	9
Touchdown	3	18	18	7	14	46
Merion	19	34	20	*	18	12

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Dr. William Meyer will answer questions on your particular sod variety needs. Please contact him at the number below:

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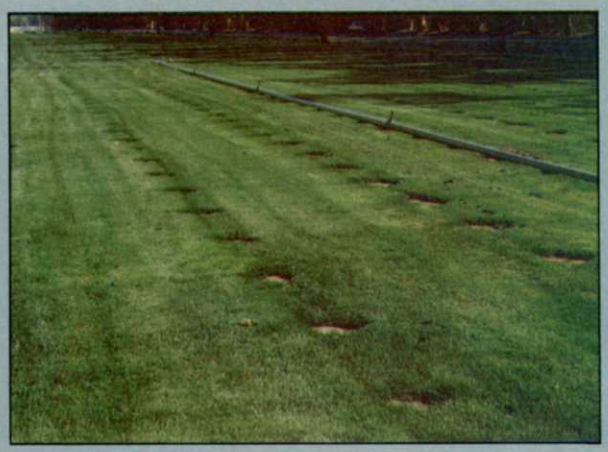

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Sun	Mon	Tue	Wed	Thu	Fri	Sat
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15	16	17	18	19	20	21
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22nd Annual North Carolina Turfgrass Conference, Jan. 3-5. Pinehurst Hotel, Pinehurst, NC. Contact W.B. Gilbert, 1119 Williams Hall, N.C. State University, Raleigh, NC 27650, (919) 737-2657.

36th Annual Agricultural Chemicals School, Jan 9-10. Contact North Carolina State University, Jane S. McKimmon Center for Extension and Continuing Education, Raleigh, NC, 27607

Maryland Turfgrass '84, Baltimore Convention Center, Jan. 9-11. Cherly Gaultney, Box 223 White Marsh, MD 21162, (301) 335-3700.

24th Annual Virginia Turfgrass Conference and Trade Show, Jan. 18-20. Williamsburg Hilton and National Conference Center, Williamsburg, VA. Contact Dr. John R. Hall, III, Agronomy Dept., VPI&SU, Blacksburg, VA 24061-7294. (703) 961-5797.

18th Annual Conference of the Tennessee Turfgrass Association, Jan. 10-11. Music City Rodeway Inn, Nashville TN. Contact Brenda Goins, Executive Secretary, 25 Coach House, 523 Harding Place, Nashville, TN 37211, (615) 832-6493.

54th Annual Michigan Turfgrass Conference, Jan. 17-18. Lansing, MI. Contact Paul E. Rieke, Extension Specialist, Turf, Michigan State University, East Lansing, MI 48824.

To insure that your event is included, please forward it, 90 days in advance, to: WEEDS TREES & TURF Events, 7500 Old Oak Boulevard, Cleveland, OH 44130.

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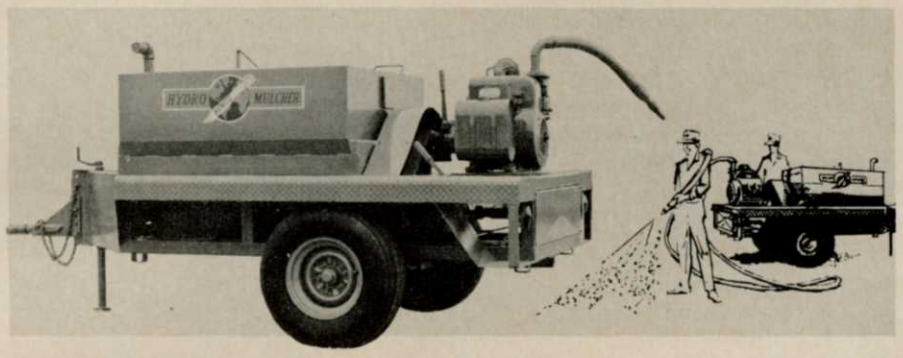

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Subdue fights Pythium blight and damping-off—as well as downy mildew (yellow tuft)—in two ways. On contact, Subdue destroys the fungi in the soil. Systemically, Subdue prevents disease from within grass plants. That's because Subdue is water soluble—easily absorbed by roots. So Pythium—and now, downy mildew—don't have a chance.

Subdue also controls costs.

Subdue's systemic action means longer, more effective residual protection. Fewer applications. Lower chemical costs. And savings in maintenance and labor. And Subdue's low application rate—1 to 2 fluid oz. per 1,000 sq. ft. for 10 to 21 days on established turf—makes Subdue the most cost-efficient protection you can buy.

Before Pythium weather strikes, subdue it. Use Subdue in a preventive maintenance control program. And get a good night's sleep.

Ciba-Geigy, Ag Division, Box 18300, Greensboro, NC 27419.

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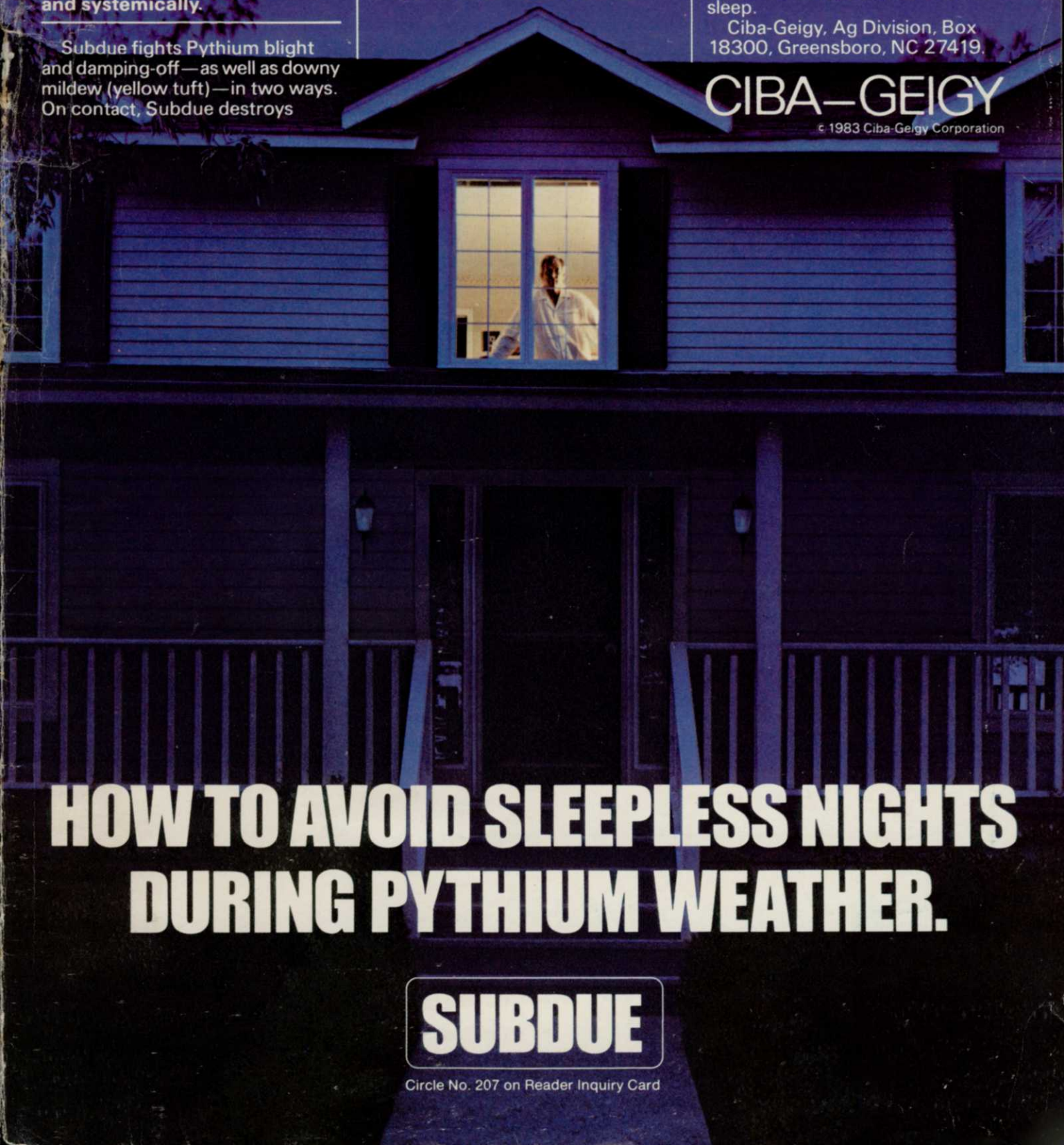

HOW TO AVOID SLEEPLESS NIGHTS DURING PYTHIUM WEATHER.

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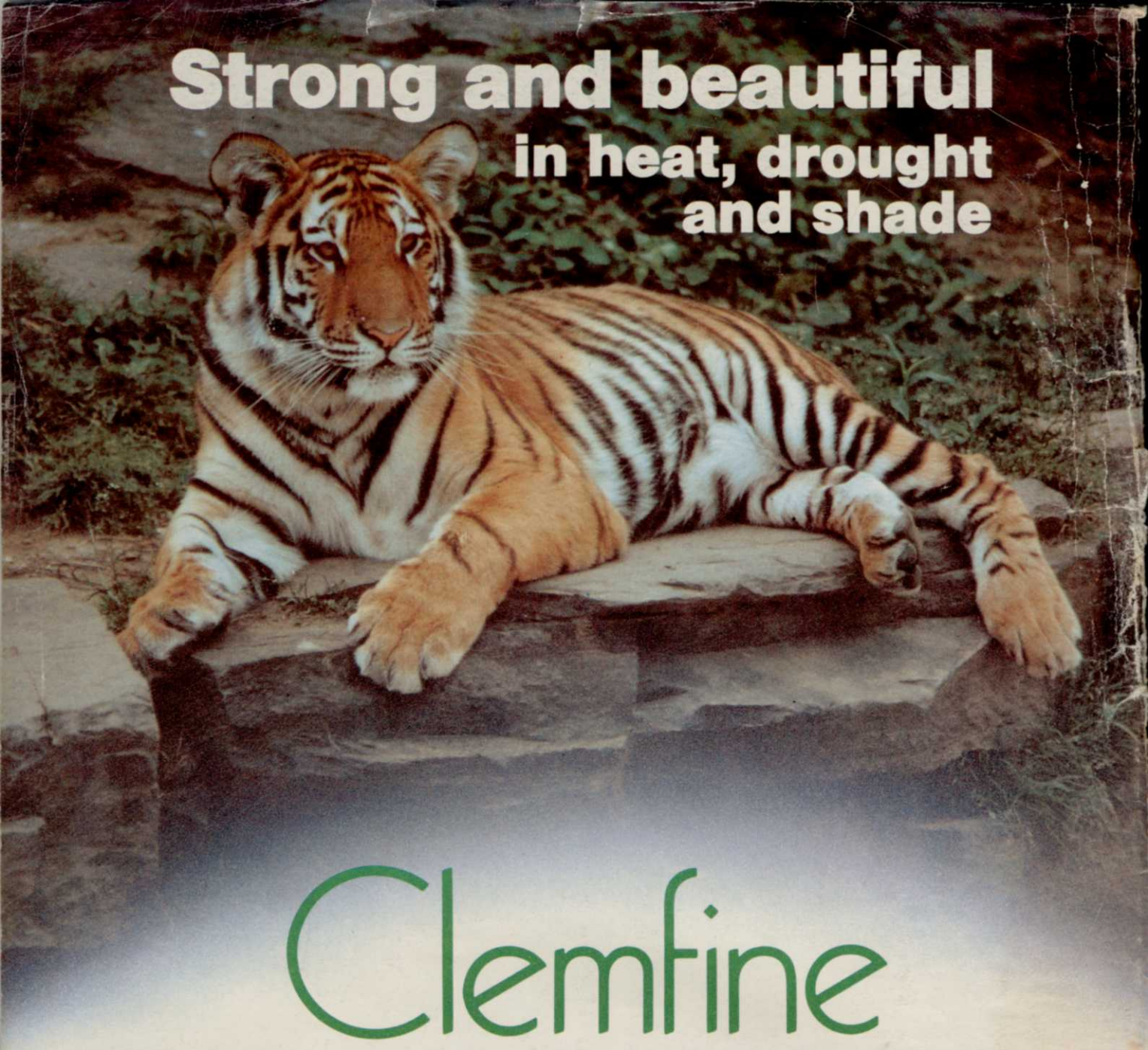

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The new Turf Type Tall Fescue . . . developed by Clemson University

What better place to develop a tall fescue that meets the demands of hot summer conditions? Not to mention the added bonus of good shade performance to answer the southern shade problem!

Clemfine was developed under the direction of Dr. Frederick Ledeboer, formerly of Clemson University and Dr. Robert Mazur, currently with Clemson University.

No pussycat, this tiger out of Clemson University. . . Clemfine turf type tall fescue.

Clemfine is a product of Great Western Seed Company and Lofts Seed Inc., and is distributed through Great Western Seed Company, Albany, OR (503) 926-5892.

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